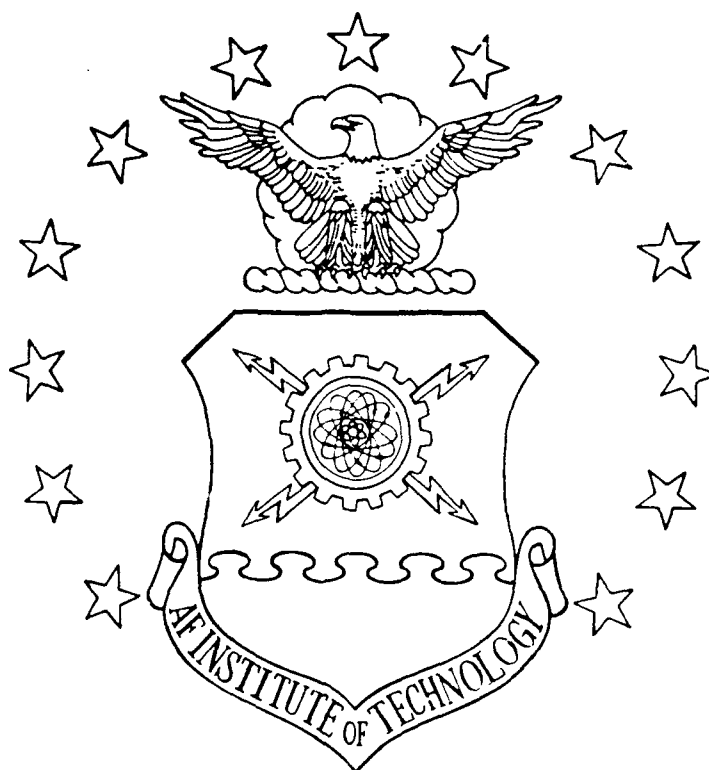②

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A COMPARISON OF NURSE STAFFING METHODS
USED BY THE UNITED STATES AIR FORCE
AND SELECTED CIVILIAN HOSPITALS

THESIS

John E. Loschiavo
Captain, USAF

AFIT/GSM/LSR/89S-27

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The contents of the document are technically accurate, and no sensitive items, detrimental ideas, or deleterious information is contained therein. Furthermore, the views expressed in the document are those of the author and do not necessarily reflect the views of the School of Systems and Logistics, the Air University, the United States Air Force, or the Department of Defense.

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THESIS

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Systems Management

John E. Loschiavo

Captain, USAF

September 1989

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I am especially grateful to the members of the nursing community cited in this study. Time and time again, they showed to me, an "outsider" to the community, the patience and understanding many people take for granted in nurses. Specifically, I thank Lt Col Priscilla McKay, Jan Bomar, Bea Haapanen, Nancy Omlor, Rosemary Pearce and Rick Somsel for their contributions to this study.

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I owe the most, however, to my wife Nancy. Though she may not have always been able to tell, this project would have been unbearable without her constant love, support and encouragement.

John E. Loschiavo

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Abstract

The purpose of this study was to compare the ways in which nurse staffing requirements are determined in Air Force and civilian hospitals. Differences in staffing methods might point to ways in which the Air Force could improve its nurse staffing process.

Data on Air Force hospitals' method of determining nurse requirements was extracted from Air Force Manpower Standards 5206 and 5207. Four civilian hospitals, whose staffing methods varied significantly, were used to represent the civilian sector. Methods were compared across five elements of the staffing process: patient classification systems, long-term requirements, short-term requirements, short-term staff adjustment, and minimum staffing standards.

The most significant difference in staffing methods lies in the area of patient classification systems. The literature and the civilian hospitals examined confirm a movement to acuity-based measurement of nurse workload using patient classification systems, though the Air Force still determines nurse requirements based on average occupied bed days. The Air Force is gradually implementing a classification system, the Workload Management System for Nursing (WMSN), but there is currently no headquarters-level program to oversee the implementation. The study recommends creation of a program funded at the Air Force level to accelerate the implementation of the WMSN in Air Force hospitals.

The other significant difference involves the hospitals' ability to supplement their baseline staff when necessary. Civilian hospitals

routinely use internal "float" pools and external agencies to temporarily
increase their nursing staff. Air Force hospitals' ability to use such
measures is limited, since funding must be provided by the individual
hospital at the expense of some other budget item. The study recommends
that the Air Force provide separate, additional funding to hospitals for
use in hiring civil service or agency nurses when a temporary need is
identified.

A COMPARISON OF NURSE STAFFING METHODS
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I. INTRODUCTION

Background

It is not difficult to find evidence of a nursing shortage. Each
year hundreds of journal articles, surveys and studies are published on
the subject (9:887-891). They approach the issue from a variety of
angles, including causes, effects, corrective actions and future trends.
Despite the different approaches, virtually all literature reviewed for
this study acknowledges that shortages and short-staffing do exist in
one form or another, and that the nurses themselves and the patients for
whom they care stand to be most adversely affected by such a situation.

Informal discussions with Air Force nurses have indicated that
while many differences may exist between civilian and military nursing,
the perception, and in many cases reality, of short-staffing is a
problem both communities share. For Air Force nurses, who incur a
minimum service commitment upon accepting an officer's commission,
encountering a short-staffed environment at their first job can be
especially discouraging. The new civilian nurse has the flexibility to
seek another job immediately, but the military nurse does not. It is
not hard to imagine a newly-commissioned second lieutenant wondering why
her school (and recruiter) "never said it would be like this." She will
serve her commitment, if for no other reason than that she must; and if

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she perceives the "grass is greener" elsewhere, she may take the first available opportunity to leave the Air Force (29). Greener grass may or may not be the case at her next job, but one thing is certain: the already short-staffed unit she leaves behind is worse off until she can be replaced.

Though it obviously does not necessarily follow that a nurse working in an understaffed unit will leave the Air Force as soon as he or she can, the short-staffing problem is sufficiently large to concern the Chief of the Air Force Nurse Corps (32). In addition, the Department of Health and Human Services appointed a special commission to study the nursing shortage (32). A recent survey of Air Force nurses (2881 respondents) yielded the following data, which clearly indicates the magnitude of the situation: 46% of the respondents reported averaging more than 50 hours of work per week; of this group, 44% cited the lack of other nurses and technical personnel (such as nurses' aides, medical technicians, and licensed practical nurses) as the main reason for working so much; 42% of the respondents felt their workload was too heavy; and 59% perceived their duty section was understaffed (4).

Statement of the Problem

Short-staffing of hospital nurses is perceived to be a problem in the Air Force. Even nurses who work in units that are 100% manned against their required strength (as determined by the manpower standards) feel they are being overworked and that their units are understaffed. The methods used to generate these requirements may therefore be inadequate in capturing the amount and types of work Air Force nurses are actually doing; if so, these methods could understate

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the number of nurses required to do that work and create short-staffed situations.

Purpose of the Research

The purpose of this research is to attempt to identify variability in the way in which Air Force and civilian hospitals determine nurse manpower requirements. By comparing these hospitals' methods of manpower determination, the researcher expects to discover differences among them. Although such differences would not necessarily mean that one staffing method is absolutely more effective than another, they may in fact represent ways by which the Air Force could improve its nurse staffing process.

Guiding Questions

The following investigative questions will guide this research effort:

1. How does the Air Force determine nurse manpower requirements?

2. How do civilian hospitals determine nurse manpower requirements?

3. How do the manpower level determination methods of civilian hospitals differ from the Air Force method?

4. How do civilian hospitals differ from one another in their nurse manpower determination methods?

Scope and Limitations of the Research

The current Air Force method of determining nurse manpower levels will be discussed in detail in Chapter IV. It is based essentially on Air Force Regulation (AFR) 25-5 and two Air Force Manpower Standards, AFMS 5206 and AFMS 5207 (26). Although the manpower standards apply to all Air Force hospitals and medical centers, there are relevant

differences in application of the standards that result from a paricular hospital's size, location or range of services (such differences are documented in the standards themselves). The researcher recognizes the impracticality of discussing each one of these differences in detail, and so has selected a specific example to demonstrate appplication of the standards.

The civilian hospitals analyzed in this study form what is intended to be a representative sample of the civilian nursing environment in general. Due to the nature of the research, literally every hospital is a potential source of a new or different staffing method. or of other information that may be useful to the Air Force. However, the limited resources available to the researcher necessitated looking only at a practical number of these hospitals.

While the Air Force nurse staffing method is characteristically detailed and documented, the researcher has observed significant differences in the degree to which civilian hospitals specify, standardize, document and regulate their nurse staffing methods. As a result, the detail in which they can be discussed here necessarily varies. This fact hardly undermines the importance of looking at hospitals whose methods are less rigorous, however. On the contrary, such hospitals are legitimate candidates for inclusion in this study, since they represent as much as any other hospital the "state of the art" as far as nurse staffing is concerned. It is entirely possible, furthermore, that hospitals with staffing methods that lack extensive policy and procedure guidelines find the results as satisfactory as those produced by the most precise, sophisticated, regulated methods.

Definitions

Throughout this paper, the following definitions will be used (unless otherwise noted):

Nurse. A registered nurse (R.N.), providing in-patient health care in a hospital.

Shortage. "An inadequate number of nurses to care for patients at some professionally determined level of adequacy" (45:205). Shortage as used in this study refers to an inability to fill existing positions, which, if filled, would constitute adequate staffing. For example, if all nursing vacancies were filled in a given unit, there would be no shortage for that unit. The concept of nursing shortage is not confined to individual units or hospitals, however; it applies nationwide and even worldwide.

Short-staffed. A condition such that, even if all vacancies are filled, there is still inadquate nurse manpower to provide patient care "at some professionally determined level of adequacy" (45:205). This definition recognizes that the number of authorized nurses for a particular unit does not necessarily equal the number of nurses required by that unit.

Civilian hospital. Any hospital not under the direction of the Department of Defense (DOD).

Work center. "A group of personnel that use similar machines, processes, methods and operations to perform homogenous work usually located in a centralized area. Personnel within a work center perform work that basically contributes to the same end product or result, and their duties are similar or closely related" (25:2).

Manpower standard. "Standard publication establishing a work center description, workload factors, manpower equation and a manpower table by Air Force Specialty Code (AFSC)" (25:2).

Work center description. "A format that identifies work center responsibilities structured for easy measurement of work categories, tasks and subtasks" (25:2).

Manpower requirement. "A unit of work, usually expressed in whole man-years, that has been recognized ... as a requirement for mission accomplishment" (25:1).

Manpower authorization. "A recognized manpower requirement (of a federal agency] that has been funded through the President's budget" (25:1).

Additive. "Work performed that is not part of the basic work center description and therefore not part of the basic work center manpower standard" (25:1).

Manhour availability factor (MAF). "The average number of manhours per month an assigned individual is available to perform primary duties. Required manhours are divided by the MAF to determine manpower requirements" (11:364).

II. REVIEW OF THE LITERATURE

Short-staffing and the Nursing Shortage

Literature on the topic of the nursing shortage and short-staffing can be found throughout professional hosptial administration and nursing journals. While authors may disagree on the causes and the remedies, few argue against the seriousness of the situation. In a recent poll of 6023 nurses, 90% of whom were R.N.s working in hospitals, over 6000 reported having an increased workload and working more overtime in the current year than in the past year (15:34,39). Mychelle Mowry and Ralph Korpman estimate the current shortage is likely to be the rule rather than the exception in the coming years, citing increasing vacancy rates and decreasing enrollment in nursing schools. This situation is much worse than previous nursing shortages, because it has spread to all sizes of hospitals, in all areas of the country, in all nursing specialties (35:20). Mowry and Korpman report that the demand for nurses in the year 2000 is expected to exceed the available supply by 1.2 million (35:21).

Genevieve Chandler would disagree with such a projection, though she too acknowledges the basic problem of getting nurses to fill the vacancies. Chandler contends that there are enough nurses already recruited and educated to alleviate the shortage, if only they could be brought back to work and retained at their places of employment (3:4). The issue, she says, is "the system is killing them softly; softly enough so it is difficult to identify a problem" (3:4). Hospitals' emphasis should be on retaining nurses, rather than recruiting and

marketing: "The plan of action would address how the hospital machine can be made to stop chewing-up and spitting-out nurses and how the system can be redesigned to retain nurses" (8:4).

Lois Friss suggests that the current nursing shortage stems from a "self-reinforcing downward cycle of occupational attractiveness" (18:235). Nurses enter the profession with a variety of educational experience, but soon reach a salary ceiling (within a few years) regardless of their education level. This makes them relatively cheap labor compared to potential technological investments such as bedside computer terminals or information systems. As such, nurses are misused, forced to do menial or clerical tasks for which they are grossly overqualified in the name of short term economic efficiency. Nursing, as a result, becomes less attractive as a career to both current and potential nurses; those in the profession leave it or work only part time, and those considering it choose other careers (18:234).

The effect on nurses who are forced to work in such an environment of shortage and short-staffing, and on the patients for whom they care, is as predictable as it is harmful. Lesley Mackay reports that 68 of 100 nurses she interviewed saw understaffing as the main cause of high stress in their jobs, stress which ultimately gets communicated to the patient (30:34). Nurses seldom have time to get "caught up", or to double-check things they have done. Furthermore, nurses' potential for injury is increased in an understaffed situation, both because they are rushing to get everything done, and because they attempt things they would not otherwise have to do, such as turning a patient by themselves because there is no one to help them (30:33). Prescott denounces hospitals that, as a matter of policy, staff themselves so thinly that

"there were inadequate numbers of nurses to meet the ... need even on units where all vacant positions were filled" (45:208). As a result of such policies, the nurses become "burned out" and the quality of the care they can give suffers (45:208). Examples of affected patient care include: patients being less carefully monitored; some treatments not being completed, such as dressing changes and turning of patients; call lights not being answered promptly; medications not being administered on time; little psychosocial support; incomplete documentation; and more frequent medication errors (48:35). Concern about this environment is echoed by Elspeth Currie, who as a British nurse has been caught up in the heavy cuts to the nursing force recently made by the British government. According to Currie, these cuts are forcing nurses to make "impossible choices between expediency and standards of care" (10:60). A "climate of negligence" is created wherein the chances of disaster increase. The painful irony in this, observes Currie, is that if something does go wrong, the nurse will be blamed by the same organization that created the climate in the first place (10:60).

Other authors take Currie's point further. More and more literature is being written on the legal liability of nurses who are made to perform their duties in a short-staffed situation. Ellen Murphy discusses the consequences of patient injury precipitated by inadequate nurse staffing. She points out that there are few cases thus far on record where a nurse has been named as a defendant for something that happened while and because her unit was short staffed (36:116). Some general trends have emerged from these few cases, however. For example, short-staffing will be considered in determining if the nurse in question acted in a "reasonable" way. It will not, on the other hand,

excuse the nurse who fails to do what a reasonable nurse would have done. If it is determined that the patient's injury would have been prevented by adequate staffing, and that the nurse acted reasonably, the hospital is more likely than the nurse to be found liable (36:117). Jeanne Bellocq believes it is unlikely that a nurse would be sued without the employer also being sued. This, she claims, is true for several reasons, including the "tremendous sympathy a nurse evokes" and the public's perception that "the nurse is not solely responsible for the patient's care" (3:76). Regardless of whether the nurse is found liable, or whether a case is even brought to court, the threat of liability caused by working in a short-staffed environment creates one more emotional and mental burden nurses do not need, but must bear. They must be ever-cautious to document their action, and possibly their protestations, taking time that could better be spent caring for patients (3:76).

Tony Delamothe perhaps best summarizes the demoralizing and detrimental effect short-staffing has on nurses, who are more and more being called upon to "shoulder an increased workload of nursing and non-nursing tasks in an environment of diminishing resources" (14:85). He points out that nurses are in the best position to know what patients' needs are, and try to meet those needs, but cannot. And "when the strain of endless falling below their standards becomes too much, they leave" (14:184).

Addressing the Situation

Given the abundance of literature on the nature and consequences of short-staffing and the nursing shortage, it is not surprising to find a

correspondingly large amount written on what can be done to resolve the situation. Authors range from nurses themseves to physicians to academicians, reflecting a variety of angles and viewpoints. As is the case with virtually any topic, an author's opinion on alleviating the nursing shortage is susceptable to bias, depending on his or her particular perspective. For example, a nurse who has recently worked on a short-staffed unit might suggest higher nurse pay as a solution. because he or she knows several colleagues who quit to pursue other (higher paying) careers. On the other hand, a hospital administrator might focus on reallocation of existing nurse resources, because ne or she believes there are enough nurses to go around; they are simply being used improperly. Whether the approach is based on systems management and statistical analysis, or personal experience and emotion, a common thread ties the literature together: the situation must be resolved in the best interests of the nurse. the hospital and most importantly. the patient.

Just as the literature on addressing short-staffing and the nursing shortage varies greatly in perspective, it varies greatly in terms of scope. Again, depending on the author (and the target audience), a journal or magazine article may propose anything from a "Here's what we did on my unit" approach to a national, indeed global, strategy for dealing with the situation. Mary Mallison cautions against relying on the latter approach too heavily:

> We now know from the most recent [American Hospital Association] survey, for example, that one in seven hospitals in this country has no nursing shortage. while another one in seven has a shortage so severe that beds have been closed or admissions have been curtailed. We are not all in the same boat. Answers are often hospital-specific, sometimes unit-specific. (31:945)

Regardless of perspective, it is useful to recall here the distinction

between nurse shortage, i.e. the inability to get nurses to fill

existing positions, and short-staffing, which concerns whether those

positons are adequate, even if they are all filled. The rest of this

section deals with the shortage itself; the next section deals explictly

with staffing.

Much of the literature takes a broad, rather philosophical view of

the shortage, centering on both the actual and perceived roles of the

nurse. Darrel Follman, for example, believes that a significant

contributor to the shortage is the "misutilization" of nurses, who have

in recent years "returned to doing menial, mundane tasks for which

they're overprepared" (17:9). "Who could imagine", he asks, "a

profession that mandates 4 years' collegiate education so that its

graduates can clean tables, make beds, run bedpans, do heavy lifting,

stock shelves..., route telephone traffic?" (17:9)

Follman, then, does not reflexively call for more nurses to

alleviate the shortage; rather, he recommends a redefinition of nurses'

workload such that they can concentrate on the more cerebral, more

challenging aspects of their profession. Implicit in his discussion is

the belief that the shortage can be at least partially reduced by

reducing the number of nurses needed to provide patient care.

Specifically, he recommends the "return to a division of labor whereby

skill and knowledge levels can be matched to patient care demands"

(17:10). Such a division would leave the routine, non-challenging jobs

to a "nonprofessional" level of worker, such as a nurse's aide, thereby

freeing the nurses themselves to focus on areas like "patient teaching,

nursing care planning and problem solving" (17:1).

Implementing Follman's idea would require, by definition, removal

of some patient tasks from the direct influence of the nurse. He

acknowledges that many nurses would become uncomfortable with the

additional distance placed between them and their patients, but

emphasizes delegation as a key ability good nurses need to develop:

> A nurse can be accountable by doing all things for all assigned
> patients, or by delegating responsibilities appropriately. After
> all, directors of nursing are held accountable - legally, in fact -
> for care to all patients under their jurisdiction even though they
> don't render it ... Because appropriate delegation for patient care
> requires an intertwining of clinical prowess with administrative
> savvy, delegation is a skill nurses must nurture, because the
> administrative dimension imminently serves the nursing interest as
> does the clinical. (17:10)

Mackay echoes the concern about the nurse's role. She cites a

study conducted in 1972 which "found fairly high levels of misuse of

nurses regarding 'non-nursing chores'" (30:34), and claims the situation

has probably gotten worse since then. Besides the obvious fact that

wasting specialized, highly-schooled nursing talent worsens the shortage

situation, such misuse has a more subtle, but equally important,

consequence. New nurses, who learned the theory of their profession in

school, will see that its practice is quite different. They will absorb

what they see other nurses doing, and incorporate that into their

personal view of nursing. If, as they enter the profession, they

witness other nurses having to do menial or clerical tasks instead of

sitting with a patient for a few minutes, they "will accept without

question that nursing is merely doing things to people - cleaning,

feeding and giving medicine. Nursing as caring is much less likely to

be learned" (30:34). If these negative effects are to be avoided,

nurses and their skills will need to be applied more carefully in the

future (30:34).

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Some argue that a change in the perception of the nurse's role must be preceded by a change in the perception of the nurse herself/himself. As discussed above, nurses are often viewed as relatively low cost sources of productivity when compared to more technological alternatives like computers or information systems (18:234). The impacts of increased workload, long shifts, and a generally high stress level take their toll on these resources, to the point where they become overloaded and react by quitting the hospital or the nursing profession altogether. Pamela Maraldo, Executive Director of the National League for Nursing, believes that hospitals perceive nurses simply as "widgets", and the public perceives them as "the loyal, courageous foot soldier who is always there when they need us" (43:89). Although neither of these perceptions is particularly malicious, a view which more accurately reflects reality is needed if nurses are expected to enter and remain in the nursing profession. According to Roy Mercer, the solution to the nursing shortage

> requires a change in the attitudes and actions of administrators
> and physicians. It requires the recognition of the value and
> contributions of those who really deliver health care, and ... a
> professional partnership with nurses even when we don't have
> nursing shortages (33:60).

In addition to such abstract approaches to the nursing shortage, there are plenty of specific, clearcut recommendations to dealing with the problem. Not surprisingly, the call for higher nurse wages is at or near the top of many lists (18:234; 34:158; 44:19; 46:7; 48:36). Both Trinosky-Lind and Friss make the point that nurses' pay is comparable to what new baccalaureate graduates make in other fields, but because nurses' pay peaks sooner, there is less incentive to make a long-term commitment to nursing (48:36; 18:234). Furthermore, the compact salary

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structure within the nursing profession blurs the distinction between
new and experienced nurses, because there is a relatively small wage
difference between these two groups (18:233). Friss calls for an
increase in the number of pay steps within an nurse's career, based on
education and experience, so that "a nurse with 15 to 20 years of
experience and demonstrated competence [would] have the opportunity to
earn at least twice the salary of a new graduate" (18:233). Generally
higher pay, with a stratified salary structure, would make nursing more
attracive as a long-term proposition for current nurses and encourage
new nurses to enter the profession (48:36).

Other specific recommendations for recruiting and retaining nurses
include: reimbursement of tuition expenses for continuing education
(24:1206); pay bonuses for signing-on, referring new nurses and
retention (24:1206; 44:19); better imformation systems (46:7; 34:158);
payment of malpractice insurance (48:36); extensive orientation for
nurses new to an organization (44:19); child care services (24:1206;
48:36); elimination of mandatory "float" policies, which require nurses
to fill in on other units (24:1206); and reimbursement for unused sick
time (24:1206). Trinosky-Lind points out, as others do, that some
hospitals do provide a few of the services listed above, but a hospital
that provides most of them is an exception. These practices need to be
adopted on a widespread basis in order to enhance the image of nursing
as a desirable profession (48:36; 44:19).

While the above recommendations are understandable and relatively
straightforward, the most controversial attempt to cope with the nursing
shortage is a proposal made by the American Medical Association (AMA) to
create a new category of health care worker, the registered care

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technologist (RCT). The RCT would be purely a bedside caregiver, recruited directly out of high school and trained in nine months to perform tasks like passing oral medication under supervision and accessing the unit computer to retrieve patient information (1:18; 40:1). An additional nine months of training would allow an RCT to be certified as "advanced", after which he or she could administer routine intravenous (IV) medications under supervision and perform sophisticated monitoring and patient care (40:1).

The proposal has sparked outrage in the nursing community. Susan Adelman notes that nurses feel the their profession is "downgraded" by the suggestion implicit in the proposal that "minimally trained people can do the same work as highly trained nurses without a loss in quality" (1:18). At the biennial meeting of the American Nurses Association (ANA) in June 1988, the 615-member House of Delegates unanimously "opposed the creation of registered care technologists on the basis that they would be unsafe, duplicative, costly, and confusing to an already confused health-care system" (34:158). Connie Curran, former vice-president of the American Hospital Association (AHA) Division of Nursing, believes the plan was "badly researched" and would have serious negative impacts on hospitals (44:2). Curran does not feel that there are enough young people "who have the literary skills, the human relations skills, and the work habits" to fill RCT positions (44:2). "If McDonald's can't find people to flip burgers for $6.50 an hour", she asks, "who's going to find RCTs to turn patients for $4.50 an hour?" (44:2).

The AMA, on the other hand, contends that many R.Ns are seriously interested in the proposal, because they see that the creation of RCTs

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may help relieve nurses of some of their too-heavy burden (40:2).

Adelman notes that the nursing profession cannot have it both ways; by

seeking higher pay and moving toward a more highly educated membership,

nurses are inviting hospitals to find less costly ways to perform many

patient care tasks. She writes:

> Hospitals will not only seek to hire registered care technologists,
> but also will develop monitoring specialists, fluid balance
> technicians, medication administrators, general ward corpsmen,
> advanced candy stripers, and anybody else who can be given an
> upscale name and paid to do parts of the job once done cheaply and
> well only by nurses. (1:18)

Despite the stiff oppositon presented by the nursing community (and

"lukewarm support from som > physicians"), the AMA voted in October 1988

to procede with pilot RCT programs (41:1). Up to four pilot projects

will begin in July 1989, at hospitals selected by the AMA, where nurses

and physicians will support the effort. Data on the programs will be

collected in early 1990, and recomendations will be made to the AMA

Board of Trustees on the future of RCTs by June 1990 (41:1).

Staffing and Patient Classification

While the nursing community as a whole is committed to finding

relief from the nursing shortage, individual nurses are likely to be

more concerned with the area of staffing, because it affects literally

every minute of their shift (22:26). The number of nurses working on a

given unit, with a given number of patients requiring some varying

levels of nursing care, relates directly to any one nurse's ability to

do his or her job (36:25). To address the shortage, one must ask "How

many nurses do we need to fill all the staff positions, and how do we

get them?". To address the issue of staffing, however, one must ask,

"How many postions do we need to provide adequate patient care?".

If the person(s) responsible for determining nurse manpower requirements for a hospital unit (usually a human resource manager and/or nurse administrator) could see into he future, he or she would know with certainty the two pieces of imformation most crucial to doing his or her job: how many patients the unit will have at any one time, and how sick each of them will be. The value of knowing the number of patients, or census, at any given time is obvious; a higher census is directly linked to a higher number of nurses required to provide patient care. What may not be so obvious, however, is that each patient will require a different amount of nursing attention based on acuity (i.e., the severity of his or her illness) (38:25). Two nurses, each caring for five patients, might therefore have workloads so dramatically different that while one is relatively comfortable in performing his or her job, the other is seriously overburdened. Thus, acuity must be considered in determining nurse staffing requirements. As Lois Nauert puts it, "Individual patients have varying degrees of nursing needs; therefore patient assignment based [solely] on census is not an appropriate method for distributing individual nurse reources" (38:25).

Unfortunately, those tasked with budgeting for nurse requirements over an upcoming year do not have the luxury of actually knowing how many nurses will be needed during that time. Still, a core, or baseline, staff must be identified and employed based on a hospital's projected census and some historical trend of acuity (6). It is essentially the variation between this projection of nurse demand and actual demand for a certain period that sets the stage for a short-staffed situation, though short-staffing does not necessarily result. If a hospital has the ability to make virtually immediate (and

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presumably more accurate) nurse requirement projections (say, for the next 24 hours), and has the resource flexibility to supplement the baseline staff if necessary, short-staffing can be avoided.

At the heart of a hospital's effort to determine adequate short-term nurse staffing levels is often some form of patient classification system (37:105). Nagaprasanna defines patient classification as "categorization of patients according to some assessment of their nursing care requirements over a specified period of time", and cites an unofficial count of some 1,000 hospitals presently using some system to classify patients (37:105).

Gallagher describes two general types of patient classification system design: prototype evaluation and factor evaluation (19:45). The prototype evaluation model is based on categories which represent increasing amounts of required nursing care. Characteristics of patients (prototypes) who would fit into each of the categories are identified, on the assumption that the categories are both exhaustive and mutually exclusive. When the time comes for a nurse to classify a particular patient, that patient's characteristics are compared to the prototypes to determine the category in which the patient should be placed. Gallagher notes that this model is subject to criticism as being "subjective and too easily interpreted differently by different nurse evaluators" (19:45).

The factor evaluation model is intended to eliminate much of the subjectivity of the prototype evaluation design. With the factor evaluation model, patients are classified according to specific factors of care or nursing activities (such as feeding, bathing, administration of medication, etc.) they require. An assessment is made of each

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patient's needs, from which an overall rating of total required nursing care can be obtained (19:45-46).

Regardless of the patient classification design used, nurse workload must somehow be quantified, either for the categories of the prototype method, or for the individual factors of the factor method. Gallagher describes two common methods for quantifying or estimating the nursing care needed for each "critical indicator of care", defined as an activity which, if it occurs, "will have the greatest impact on nursing care time" (19:46). For the prototype design, estimates of nursing time assignable to each category are determined by sampling the time spent on patients within that category, and calculating an average time. (Remember, patients are initially placed in the same category if they require the same type of care.) The approach for the factor design involves determining a standard time for each activity, and multiplying it by the number of times that activity occurs. The resultant times are then totaled for each patient, to determine required nursing time (19:46). The problem with quantifying nurse workload using the "category" method is, as Gallagher points out, "largely one of precision", especially when the range of criteria for inclusion in the category is broad (19:46). He cites the example of a unit that has previously calculated an average of 2.5 required hours per shift for patients in a particular category. If all of the patients currently in that category turn out to need 3 hours of care per shift, the unit could be understaffed. Understaffing can also occur when a number of patients in a particular category falls just short of qualifying for the next higher category, and consequently of qualifying for additional staff (19:46).

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The "time per activity" approach reduces some of the uncertainty of the category approach, but is not without shortcomings of its own. Gallagher states that a major reason for its (historically) limited usefulness is the failure to recognize that the same activity may require a different time on different units or even different shifts. A second reason is the failure to distinguish between high and low impact activities, i.e., which factors to include in the evaluation and which to leave out. If too many are included, classification becomes too "encumbering" and time consuming (19:46).

Edward Halloran et al. criticize the factor evaluation model of patient classification as being too simplistic to be of much use:

> Patient classification schemes traditionally conceptualize nursing as the completion of some standard work complex or task pattern (defined in time intervals) associated with selected patient demand attributes. Assumed in these staffing methodologies is the existence of a standard value which defines the nurse-patient ratio applicable to all situations ... Differences among nurses, in organizational support systems, tradition (past practices) and economics play no part in determining staff size and composition in these methodologies. (23:28)

Halloran et al. suggest that a more accurate method of patient classification is one that captures not only the physical aspects of nursing, but the "intellectual" aspects as well (23:29). Since a nurse's assessment of a patient is a large determinant of the care that will follow, a classification system should incorporate that assessment. Such a "nursing diagnosis-based" system defines the relative need for nursing care by capturing information on a patient's "conditions" on a daily basis. These conditions are assessed by the nurse (essentially a "yes/no" judgement) and are intended to form a complete picture of the patient from which required nursing care can be determined. Examples of conditions include: potential for injury; less nutrition than required;

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activity intolerance; impaired mobility; discomfort; pain; knowledge deficit; anxiety; and potential for growth in family coping (23:37-38).

Halloran et al. contend that the nursing diagnosis classification system, if implemented properly, provides information sufficient not only to insure adequate numbers of staff, but also to optimize the match between patient and nurse (23:40). As part of the implementation, information is maintained on the available nursing staff, such as "education, experience, capability to perform physical and psychological aspects of care, and salary rate" (23:41). Management can thus review the personnel on upcoming shifts and assign them to those patients whose conditions they can best handle.

An important part of any patient classification system is its interrater reliability. Phyllis Giovanneti defines interrater relaibility as "the result of two or more persons classifying the same patient at the same time" (20:6). She notes that reliability is a matter of degree, and that high reliability must be pursued continually:

> High interrater reliability coefficients provide assurance that the same category of care will be determined for the same patient by different nurse raters. A high reliability coefficient does not mean that the instrument will be reliable forever... The most effective way to ensure a high coefficient of equivalence, or interrrater reliability, is to provide an inservice education program for all members of the nursing staff who may classify patients... Once an acceptable level of reliability has been achieved, periodic checks should be made to ensure that reliability continues. (20:6-7)

Nagaprasanna points out that the number of patient classification systems currently in use is unknown, but a recent survey of hospitals indicated that 42% (of 231 respondents) used an internally developed system (37:106). Sixteen percent reported using commercial systems, such as CASH, MEDICUS and the University of Saskatchewan system

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(37:105). While some patient classification systems are usable throughout the entire hospital, others may be unit-specific, as in the case of the Therapeutic Intervention Scoring System (TISS). TISS is a simple-to-score system designed to measure patient care needs on an intensive care unit (ICU) (28:79). It makes use of over seventy therapeutic interventions (ICU nursing tasks or diagnoses), each of which has an associated point value ranging from 1 to 4, depending on the intensity of nurse involvement. An ICU nurse classifies a patient by totaling the applicable points every 24 hours, and places him or her in one of four categories which reflect amount of required nursing care. According to Rena Litt, TISS can be used "to determine the severity of illness, establish nurse-patient ratios in the ICU, ... analyze the cost of intensive care in relation to the extent of care offered, and ... for comparing similar data from other hospitals" (28:79). In addition, TISS can be used to determine if a patient needs to be admitted to the ICU in the first place, or if continued stay is necessary (28:79).

A classification system of particular interest to the Air Force is the Workload Management System for Nursing (WMNS), developed by the Department of Defense. It is a two-part system which enables managers both to categorize patients according to required nursing care, and to allocate nursing resources (50:290). Details of the WMNS will be discussed in Chapter IV.

Regardless of what type of patient classification system a hospital chooses to use, the system's primary purpose is to determine staffing requirements, usually in the very near term (37:105). When the projected staff requirements exceed the baseline staff employed for a particular unit, the hospital may have to make a temporary staff

adjustment. Available options include increased overtime, using an internal "float" pool, or hiring from an external agency (27). Short-term staff adjustments will be discussed in Chapter IV.

Summary

The current nursing shortage affects nurses, patients and the health care industry as a whole. The chapter discussed the causes of, impacts from and solutions to the shortage, but virtually all authors agree something must be done to rectify the situation. The creation of RCTs is the AMA's most current, most controversial large-scale approach to the problem. On a lesser but no less important scale, nurses are concerned with the staffing levels on their own unit, which may or may not be sufficient to provide adequate nursing care, even if all staff positions are filled. Patient classification systems, including the Workload Management System for Nursing (WMSN) developed by the Department of Defense, are a popular means of determining nurse staffing requirements in the short term. When a system indicates a need for more staff on a unit than is scheduled for that unit, a hospital can meet the need by increasing overtime, using nurses from an internal "float" pool, or hiring nurses from an agency.

III. METHODOLOGY

Research Design

C. William Emory identifies seven different perspectives from which research designs can be viewed (16:59). Two of these perspectives are particularly relevant to the design of this research: 1) the method of data collection and 2) the type of study, determined by the study's purpose (16:59).

Data Collection. In discussing methods of data collection, Emory distinguishes between "observational and survey data collection processes" (16:60). As part of the observational process, the researcher simply watches and collects information; he or she does not interfere or interact with the subjects of the research. To gather data by survey, however, the researcher must interact with the subjects, "interrogating" them and recording their responses (16:60). Emory cites "a traffic count at an intersection [and] a search of a library collection" as examples of observation, and suggests "mail, telephone or personal interview" as different media for conducting surveys (16:60).

Given the right circumstances, the task of collecting data on hospitals' nurse staffing methods could conceivably be accomplished by a purely observational (as defined by Emory) process. The staffing methods would have to be either simple enough to be describable solely from watching their application, or documented thoroughly enough to be comprehensive and perfectly self-explanatory. The question of adequate documentation was answered early in this study. The Air Force manpower standards and their guidelines for application are quite explicit (with

supporting information available in AFR 25-5); as such, they surrender a great deal of useful data to observation. On the other hand, many civilian staffing methods are noticeably lacking in written detail. Informal, preliminary telephone conversations with several civilian nurse administrators indicated that their staffing methods were certainly understood by the people in their hospitals who used them. Outsiders, however, could not understand the methods based solely on what was documented, since many parts of the process were either not written down at all, or written too vaguely to be of much use.

Directly observing the application of the staffing methods requires both time and timing, neither of which could be guaranteed to the researcher for any given hospital. For example, in order to watch a nurse administrator develop an annual nurse staffing budget and then be able to describe the process thoroughly, one must be available at the time (of year) and for the whole time the budget is being worked on. Coupled with the fact that many elements of the staffing process may be too subtle for an outsider to detect independently, and compounded by the number of hospitals addressed in the study, the issues of time and timing made data collection purely by direct observation infeasible, if not impossible.

To overcome the limitations of the observation process in supporting the objectives of this study, the researcher found it reasonable to conduct surveys in the form of personal interviews. The interviews were very loosely structured, since the variety of both staffing methods and staffing terminology among hospitals made a highly structured, generic questionnaire impractical. Telephone interviews were considered, since they would allow a greater range and number of

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data points. However, the researcher learned from the preliminary

conversations discussed above that integral parts of the staffing

process such as budget reports, manpower tables and patient

classification systems need to be seen to be truly understood.

Telephone interviews were thus of insufficient value as a primary means

of data collection, though the researcher found them helpful in getting

clarification and follow-up information when necessary.

In summary, the researcher used both observation and survey

processes in collecting data for this study. Observation was most

useful in analyzing the Air Force method for determining nurse staffing

requirements. Surveys, in the form of personal and telephone

interviews, were used to obtain analagous data from the civilian

hospitals. The procedure for selecting hospitals for the study is

described later in this chapter.

Type of Study. Emory categorizes studies as either descriptive or

causal. The difference between them, he writes,

> ...lies in their objectives. If the research is concerned with
> finding out who, what, where, when or how much, then the study is
> descriptive. If it is concerned with learning why, i.e., how one
> variable affects another, it is causal. (16:60)

Using Emory's distinctions as a guide, this study must be classified as

descriptive. Its purpose, as stated in Chapter I, is to identify how

Air Force and civilian hospitals determine nurse staffing requirements,

and to examine areas where their methods differ. To that end, much of

the analysis is dedicated to describing, in considerable detail, the

results of the data collection process discussed above. The remainder

of the analysis focuses on qualitatively comparing the subject

hospitals' different ways of dealing with various elements of nurse staffing, and suggesting some positive and negative consequences of each method.

Selection of Hospitals

In a study such as this, where one intentionally seeks variety in the sample. literally every member of the population merits consideration for inclusion. It is impossible to know, without sampling every hospital, the number of different methods used to determine nurse staff requirements. The differences may be great or slight, but even the slight differences may have a significant impact on the results. Therefore, only a sample size as large as the number of hospitals will insure that all methods are analyzed. While a much smaller sample size will support statistical inference. quantitative generalizations to certain population parameters do not serve the interests of this study.

Limited resources dictated that researcher establish priorities as to which hospitals would be represented in the analysis. He determined that hospitals demonstrating differences within significant elements of the staffing process should compose the sample. Early telephone inquiries and the first formal interview were used to categorize the data into four general staffing areas (discussed in the next section). The researcher also identified another key element (i.e., patient classification systems) that impacts more than one area and is a major contributor to the staffing process.

By subsequently looking for hospitals which provided variety in one or more of these areas, the researcher was applying a

non-probability sampling technique called "purposive sampling" (16:280).
Emory legitimates the use of non-probability sampling when one is
"looking only for a feel of the range of conditions, or for examples of
dramatic variations" (16:279). A problem with purposive sampling, where
one "handpicks sample members to conform to some criterion" (16:280), is
that the necessary conformance is not always evident. In this study,
for example, the researcher could only tell which hospitals would
provide variety by actually contacting them. To deal with this problem,
the researcher simply selected hospitals, in alphabetical order, from
the local telephone directory and called each hospital's responsible
nurse staffing person(s). When no one was available, the next hospital
was called. Once the researcher located someone qualified to discuss
nurse staffing, he explained the purpose of the study and described the
staffing areas in which he sought variety. If the hospital's staffing
method appeared to demonstrate the requisite variety, an appointment was
arranged for a formal interview. In all but one case, the hospitals
that were selected for formal interviews are included in this study. The
exception was a hospital that was about to implement a new patient
classification system at the time of the interview. Subsequent changes
to the system and delays in its implementation prevented the researcher
from acquiring sufficient information to adequately describe the
staffing method.

The researcher used the local phone directory (and consequently,
local hospitals) as a matter of convenience. During one of the
preliminary telephone conversations, however, a nurse administrator
suggested that the researcher try to find an example of a hospital that
used a particular general approach to nurse staffing (6). The

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researcher was able to locate such an example in Chicago, i.e. the University of Illinois Hospital, and arranged for an interview there.

Bases of Comparison

The general staffing-related areas into which the data for this study can be categorized are: long-term staffing requirement determination; short-term staffing requirement determination; short-term staffing adjustment; and minimum staffing standards. Along with patient classification systems (which may affect none, one or more of these areas, depending on the hospital), these areas represent the bases of the comparisons drawn among the sample hospitals:

Patient Classification Systems. Described in Chapter II. Their inclusion as a basis for comparison is driven by the fact that, in hospitals where they are used, they intergrally affect the other areas explained below. The different types of systems affect nurse staffing differently. In addition, application of the systems can also vary, yielding different results in two hospitals using the same system.

Determination of Long-term Staffing Requirements. Describes the way in which hospitals project annual nurse staffing needs. These requirements typically take the form of budgeted full-time nurse equivalent positions, rather than numbers of actual nurse employees. They are also referred to as "baseline" or "core" staff positions.

Determination of Short-term Staffing Requirements. Describes the way in which hospitals determine more immediate staffing requirements. These requirements are a refinement of the baseline staff, and usually address needs of the next 24 hours. In some hospitals, an intermediate refinement is also made on a monthly, or bi-weekly basis.

Short-term Staffing Adjustment. Usually intended to reconcile the difference between the baseline staff positions and current nurse requirements, as determined in the short-term. The adjustment may involve assigning additional staff, reducing the number of staff, or redistributing the staff among hospital units. Short-term adjustments may also be required simply to fill the baseline positions.

Minimum Staffing Standards. Refers to the existence of, and level of, minimum numbers of nurses required to be on duty at any time. Minimum standards may vary by unit, or shift, or both.

IV. ANALYSIS

Description of Staffing Methods

U.S. Air Force.   Although the Air Force uses a patient classification system (the WMSN, discussed below) in some of its hospitals, the system currently plays no part in the long-term staffing process (5).   Instead, as noted above, Air Force nurse manpower requirements are currently established on an annual basis in accordance with Air Force Regulation (AFR) 25-5 and Air Force Manpower Standards (AFMSs) 5206 and 5207.   AFR 25-5 defines the policies, responsibilities and requirements of the Management Engineering Program (MEP), the purpose of which is to "develop unconstrained manpower standards that address peacetime and wartime requirements at varying levels of workload" (11:1).   AFMS 5206 and AFMS 5207, which were developed by the Air Force Medical Management Engineering Team (AFMEDMET), are used to quantify, in the form of mathematical equations and tables, the man-hours and attendant number of nurses required to accomplish specified medical/surgical and obstetrical nursing tasks.   The standards also identify the number of non-nurse personnel required (12:17; 13:2).

AFMS 5206 is used to determine the manpower requirements for the Medical/Surgical Nursing Unit work center.   It contains an attachment which describes the tasks nurses and technicians in the medical/surgical units are expected to perform.   These tasks include direct care of medical/surgical patients, direct care of gynecological patients, sanitation, and indirect nursing duties, such as supervision,

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administration, training, and attending meetings (12:5). This attachment to the standard is called the work center description (WCD).

In theory, the medical/surgical WCD contains only tasks that are essential to the mission of medical/surgical units. It does not include inferred or assumed workload, since "inferred workload is the responsibility of another work center or function, [and] assumed work is not necessary for the mission" (11:37).

The procedure for developing a manpower standard from a WCD is thoroughly documented in AFR-25-5. In the case of AFMS 5206, the result was two basic manpower equations which represent the core of the Air Force nurse staffing process (for medical/surgical units). The two equations are the starting points for a facility's determination of nurse requirements, and are mutually exclusive in their application. The first equation,

$$Y = -17.23 + 3.541X1 + 4.137X2 + 4.231X3 + 1.222X4 \qquad (1)$$

is used by all hospitals not part of a medical center. The other equation,

$$Y = -1303 + 3.785X1 + 4.925X2 + 4.704X3 + .9188X4 \qquad (2)$$

is for use by medical centers. For both equations,

X1 = average days of bed occupancy by medical and surgical patients/month (excluding pediatric, nursery, neonatal intensive care, psychiatric and obstetric patients)

X2 = average days of bed occupancy by pediatric patients/month

X3 = average days of bed occupancy by psychiatric patients/month

X4 = average days of bed occupancy/month by patients 65 years old and over (12:1-2).

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The dependent variable, Y, represents the total number of basic manhours required to staff the medical/surgical units of the facility for a month. Because of the potential for a large month-to-month variance in the medical workload dictated by occupied beds, values for X1, X2, X3 and X4 are computed from data gathered over the past twelve months (12:1).

In addition to equations which calculate the number of basic hours required to staff the medical/surgical units, AFMS 5206 specifies several additive equations which may apply, depending on the nature of the services offered by the particular facility. Criteria for applicability of additives include whether the facility has a close observation room (COR), a special care unit (SCU), a hemodialysis unit, a residency teaching program, and whether the medical/surgical units perform subspecialties such as cardiology, hematology, neurosurgery, oral surgery, thoracic surgery, and urology (12:24-36). The additives for subspecialty and hemodialysis result in manhours that are added to the basic requirement to determine total monthly manhour requirements for the medical/surgical units, exclusive of the SCU, COR and residency teaching program. This total is then divided by the appropriate manhour availability factor (MAF) to determine the number of personnel required to staff the units. For the SCU, COR and residency teaching program, the name "additive" may be misleading. Results from the equations are not added in with the total described above. Rather, each equation represents a total in and of itself, which is separately divided by the MAF to determine the manpower requirements for the area. The reason for this distinction becomes clear when the next step in the process is examined.

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After the number of personnel required has been calculated, the appropriate skill mix must be determined. AFMS 5206 contains a standard manpower table that specifies, by grade and Air Force Specialty Code (AFSC), the mix for a given number of required personnel, from which the number of nurses can be determined. Because the required skill mix for the SCU, COR and residency teaching program is different (more nurses, fewer technicians), tables separate from the basic must be used. This is why the manpower requirements for these areas maintain distinct identities, rather than being blended in with the other medical/surgical requirements. For all areas, AFMS 5206 provides minimum staffing requirements. If the number of personnel "earned" by the equations is less than the minimum, the minimum is used instead.

Application of AFMS 5207 follows the same general procedure. AFMS 5207 quantifies the manpower required to accomplish the tasks listed in its WCD for obstetrical nursing units (13:1). Like AFMS 5206, the AFMS 5207 WCD includes direct tasks, such as labor and delivery, nursery, obstetrical (ante and post partum) patient care and sanitation, as well as the same indirect tasks (13:4).

The basic manpower equation for AFMS 5207 uses average births per month as the only dependent variable, X:

$$Y = -52.27 + 73.67X \qquad (3)$$

Again, Y represents the basic manhour requirement to staff the units for a month, and is divided by the number of hours each person is expected to work per month (the manhour availability factor) to determine the required number of personnel. If, for example, the hospital averages 25 births each month, the number of basic required manhours is

calculated to be 1,789. When divided by the MAF of 145.2, this total

equates to a requirement for 12 persons to staff the obstetrical

units. Only two additives may affect this number: one for a residency

teaching program and/or and one for a neonatal intensive nursery. The

residency teaching program additive is identical to the one used in AFMS

5206. The neonatal intensive nursery additive is quite straightforward:

if the facility has a Neonatal Level II nursery, a constant requirement

for twelve additional personnel is added to the total; twenty-five are

required for a Level III nursery (the differnece between levels is a

matter of size and degree of care that can be provided). AFMS 5207 also

provides breakdown of required personnel by grade and AFSC, as well as

minimum staffing levels (13:2,17).

After each unit has applied the appropriate standard and additives,

total nurse requirements for the entire facility are consolidated. At

this point, the number of required nurses may be adjusted, based on

factors external to the standards, such as changes in procedure, new

technologies, or projected higher (or lower) workload (26). Then, each

hospital and medical center submits its standard-earned manpower

requirements, along with justification for any necessary adjustments, to

HQ USAF via its major command. The manpower section of the Surgeon

General's office (HQ USAF/SGHM) reapplies the standards, validates each

hospital's requirements, and consolidates them. They are then forwarded

to the Department of Defense for inclusion in the the DOD budget request

(25:5). These requirements may or may not be funded, but either way

they are a matter of record (26).

An example using a specific facility (the Wright-Patterson AFB

Medical Center) best demonstrates how each hospital applies the manpower

standards in accordance with its individual characteristics to determine nurse requirements. Using data compiled over the last 12 months, each Wright-Patterson medical/surgical unit applies equation (2) of AFMS 5206 to determine basic manhour requirements. Equation (2) is used, since the facility is classified as a medical center. Attachment 11 of AFMS 5206, an applicability matrix, describes which additives are relevant for each facility (12:45). In the case of Wright-Patterson, the additives for subspecialty patients and hemodialysis apply. The manhours resulting from their equations are totaled with the basic manhours and divided by the appropriate MAF, 145.2, to yield the number of personnel required to staff these units. By consulting the standard manpower table, one can determine how many of these personnel are nurses. The calculations do not end here, however, since Wright-Patterson also has a SCU and residency teaching program. For each of these two areas, the additive equation in AFMS 5206 is applied, required manhours are calculated, manhours are divided by the MAF, and the number of nurses is read off the appropriate manpower table.

At the same time, the Wright-Patterson obstetrical units apply AFMS 5207 to determine their own requirements. They use equation (3) to determine basic manhour requiremnts and, as above, calculate the number of nurses from the MAF and manpower table. Again, the residency teaching program additive generates further nurse requirements and, because Wright-Patterson has a Level II neonatal intensive nursery, an additional six nurses are needed (13:17).

Although all Air Force facilities determine annual staffing requirements in the manner described above, Military Airlift Command (MAC) hospitals have implemented the WMSN patient classification system

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as a means to determine short-term nurse requirements. Classification according to the WMSN is derived from the amount of direct nursing care required. "Direct nursing care" is defined as "nursing activities that take place in the presence of the patient, the patient and his or her family, or the family" (50:291). The activities

are:

> observable, behavioral, and include positioning equipment, explaining the procedure to the patient, preparing the patient, performing the procedure, removing the equipment from the area, recording the activity, assessing and observing, and teaching. (50:291)

A user of the WMSN determines which direct nursing care activities are projected to be performed over the next 24 hours, based on critical indicators of care in the areas of: vital signs; feeding; emotional support; treatments, procedures and medications, intravenous therapy; teaching; monitoring; activities of daily living; and continuous care (50:291). Points are assigned for specific indicators in each critical area, and are totaled across all areas to determine a patient's category. (Category I equates to minimal care and Category VI equates to extensive nursing care.) Though the point values for each indicator are fixed, the classifying nurse has some discretion in insuring that nursing care needs are thoroughly identified. Some indicators, for example, allow the nurse to assign points for each time the activity is expected to occur. Others allow the points to be doubled if two people are needed to complete the task. Once the nurse has categorized all patients under his or her care, he or she determines total nursing care hour requirements by consulting charts developed for the appropriate clinical area: medical-surgical, pediatrics, psychiatry, obstetrics-gynocology, nusery or critical care. Each patient in a

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particular category translates into a certain number of required nursing

care hours, a number which varies depending on the clinical area. At

this point, the charge nurse can convert the total care hour

requirements into the recommended staff mix, using charts developed for

that purpose. Like the required nursing care hours, the staff mix

varies according to clinical area, but it also varies by shift. A total

staff requirement of 40 persons for a 24-hour period breaks down to a

need for 7 day shift nurses on an obstetrics unit, versus 11 on a

neonatal intensive care unit. Because each nursing hour care

requirement chart has a percentage of time factored in to account for

indirect nursing care time, the charts are meant to represent total care

requirements (50:291).

Vail et al. cite several potential uses of the WMNS at the hospital

level, in addition to its ability to determine staffing requirements.

For example, it can be used to demonstrate a need for additional nurse

authorizations, or to justify existing positions. It might provide a

way to direct admissions to less burdened units, if the hospital has

sufficient flexibility to do so. It provides a basis for comparison of

what patient care is needed (as documented by the system) and what care

is actually being provided and documented. Finally, it facilitates

workload-to-staff ratio comparison as a measure of nurse productivity

(50:292). Though these comments were directed at the WMSN, they could

be made about a number of other patient classification systems.

The Department of Defense (DOD) has directed that all military

hospitals begin providing patient acuity data generated from the WMSN by

1 October 1989 (5). The data will ultimately be needed for use in

conjunction with DOD Joint Healthcare Manpower Standards, which are

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currently being developed. The 1 October deadline requires, of course,
that the hospitals implement the system prior to that time. Presently,
only a small percentage of Air Force hospitals have the WMSN in place,
and few more will have it by October. There is no integrated Air Force
plan, and consequently no timetable, to meet the DOD requirement (5).
Instead, each hospital commander must identify the necessary resources
to implement the system, but these resources must come from within the
hospital's existing budget. This situation has caused and will continue
to cause extensive delays in establishing the WMSN as an DOD-wide
patient classification system, and may eventually impact the Air Force's
ability to comply with the joint manpower standards when they are
published (5).

University of Illinois Hospital. In contrast to the highly
regulated, management-engineered approach used by the Air Force, the
long-term nurse staffing method used at the University of Illinois (U of
I) is far less rigid. It is based essentially on experience-driven
staffing standards and a projection of the average daily census (ADC),
i.e. the average number of patients that occupy beds each day (21).

In the late 1970's, U of I used the MEDICUS classification system
to measure patient acuity. MEDICUS, a commercially developed product
(to be discussed in the next section), was never totally accepted by the
nursing staff, perhaps because it did not quite "fit" the paricular
hosptial (21), and perhaps because the nurses required to use it had no
say in its development (37:106). In any case, the MEDICUS system,
short-lived at the U of I Hospital, had no significant impact on nurse
staffing.

More recently, the U of I Hospital attempted to develop its own patient classification system. The system was intended for use primarily as a means by which the hospital could formulate its annual nurse staffing budget, drawing upon acuity data as a more relevant measure of nurse workload than occupied bed days. The effectiveness (or ineffectiveness) of the system was never demonstrated, however, because it was never implemented. By the time it was almost ready for implementation, U of I had decided to "get out of the hospital business" (21). The plan was that the U of I Hospital, beginning sometime around December 1989, would be run as a Cook County facility. With the future of the administration and staff in serious doubt, plans to implement the internally-developed patient classification system were dropped (21).

The current situation notwithstanding, the U of I Hospital still has had to determine nurse staffing requiremnets in order to establish operating budgets. As suggested above, the staffing standard is at the core of the U of I's staffing process.

The staffing standard represents the average number of patients for which one caregiver should be responsible (49:1). Although at one time the term "caregiver" may have meant nurse, licensed practical nurse (LPN) or nurses' aide, it may be read today simply as "nurse", since the hospital uses the primary (i.e., essentially all-R.N.) approach to nursing care (21). The staffing standard is expressed as a decimal number, rounded to two significant digits, and varies from unit to unit. For example, the standard for the surgical intensive care unit (SICU) is 1.14, meaning that a nurse on that unit should be responsible, on average, for the care of 1.14 patients. The pediatric unit, on the other hand, has a standard of 3.12 (49:1). The standards were

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established by the Department of Nursing and the head nurses, based not on policy or procedure but rather experience and "corporate knowledge" (21). Implicit in the standards is the assumption that they are sufficient to insure adequate patient care. In other words, they are more than just an average of what has been provided historically. Since they are used to determine future requirements, they must reflect patient-nurse ratios that, in the administration's and nurses' opinions, satisfactorily address patient care needs, regardless of how the requirements have actually been met in the past.

To bridge the gap from staffing standards to nurse requirements, the U of I Hospital requires a projection, by unit, of the ADC for the upcoming budget year. This "occupancy projection" is provided by the finance department and is based on recent trends as well as known future developments that may impact a unit's staffing requirements (49:1; 21). If, for example, the SICU is scheduled to add (or lose) a particular procedure during the next year, the number of nurses needed to staff the unit will obviously be affected, since more (or less) workload will be created. The workload of other units, such as the step-down unit (where patients requiring less intensive nursing care may be transferred upon leaving the SICU), will also be affected (21).

In order to determine nurse staffing requirements for a particular unit, the U of I Hospital Department of Nursing begins by multiplying the appropriate staffing standard by the projected ADC for that unit. The product represents the number of nurses needed to staff the unit for an eight-hour shift, assuming that all nurses working the shift are full-time employees. Since this assumption is not always valid, the product is actually expressed in terms of full-time equivalent (FTE)

nurses. An FTE nurse (or simply FTE) is a unit of staffing measure
which describes 8 hours of nursing care, regardless of whether the care
is provided by one full-time nurse, or two or more part-time nurses
working consecutively (21). The FTE concept is important because it
focuses attention on the number of nurse staff positions available to
provide care for any one shift, and not on the total number of staff,
which may be different. Since there are three shifts per 24 hour
period, the number of FTEs per shift is multiplied by three to give the
number of FTEs needed for an entire day. To find the approximate number
of full-time nurses required to staff the unit for a whole year, the
daily FTE requirement is further multiplied by 365 and divided by the
number of shifts a full-time nurse typically works per year (a
historically based constant). This yields the number of nurses, working
eight-hour shifts, required to staff the unit for the year, taking into
account time off, sick time and vacation (21). Though as noted above
all of the hospital's nurses will not be full-time employees, this
method is apparently sufficiently accurate for budgeting annual staffing
needs. The same process is used to generate monthly requirements, since
the hospital analyzes variance between actual and required staff on a
monthly basis (49:1). The total nurse requirement for the entire
hospital is simply the sum of the requirements from each of the units.

The U of I Hospital has no formal guidelines for determining
short-term nurse requirements. The head nurse on each unit has the
authority and responsibility to use his or her judgement in determining
how many nurses are needed at any given time. If the head nurse feels
addititonal staff are necessary to meet patient care needs, he or she

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contacts the nurse administrator (or her delegate), who then attempts to find staff to fill the need (21).

St. Elizabeth's Hospital. Since 1980, St. Elizabeth's Hospital has used the MEDICUS patient classification system as the primary input to its nurse staffing method. In addition to its inherent purpose of determining overall caregiver requirements based on patient acuity, MEDICUS has a programmable feature which allows nursing administrators to break down the recommended amount of care by shift and by skill mix (47).

The heart of the MEDICUS system is the classification sheet, on which nurses mark appropriate care requirement indicators for each patient under their care. (There are actually two different classification sheets, each with a different set of indicators: one for the medical/surgical units and one for the psychiatric units). Patients are classified once a day according to MEDICUS, during the day shift. Classification involves a nurse's assessment of which care indicators will apply to the patient over the next 24 hours. For some indicators, such as taking vital signs, frequency of care is also a factor. Examples of other MEDICUS critical indicators of care include (for medical/surgical units): partial immobility, sensory deficits, bath with assistance, specimen collection and special teaching needs (47).

Nurses at St. Elizabeth's classify their patients at approximately 10:00 a.m. each day. This time has proven historically (at least for St. Elizabeth's) to be the most "representative" of the day shift nurses' workload - not the busiest, and not the least busy. Since a nurse's assessment of patient care requirements is undoubtedly influenced by his or her workload at the time the assessment is made,

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the "representative" time was deemed the logical choice for patient classification (47).

Although there is obvious benefit in a system that requires classifications only once a day, there is also a less obvious shortcoming: patient acuity, census or both may change without notice in the 24 hours between classification. A patient classified at 10:00 a.m. on Monday may need significantly more or less nursing care by 2:00 a.m. Tuesday, as his condition worsens or improves. The census of the ICU may double from 3 to 6 patients during the evening shift, perhaps doubling the amount of nursing care required during the night shift. Despite this unpredictability, however, the St. Elizabeth's nursing director believes that such circumstances for the most part even out, and that the once-a-day classification system is an adequate measure of patient care requirements (47).

Recommended staffing for all units (except labor and delivery, which will be discussed later) is provided directly by MEDICUS. As an example, assume the pediatrics unit has just completed classifying its patients. Each care indicator is weighted with a certain point value, so each patient has "accumulated" a number of points based on his or her unique nursing care needs. In the MEDICUS system, this number of points identifies the patient as one of five "types", ranging from Type I (0-24 pts; requiring minimal nursing care) to Type V (181+ pts; requiring intensive care). From these types, a workload index (WI) for the pediatrics unit is computed. The WI attempts to capture nursing care requirements, taking into account patient census and acuity. Acuity is represented by a "relative acuity value", constant for each type and

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furnished with the MEDICUS system (47). The WI is calculated as follows:

$$WI = (\text{Type I census} \times .05) + (\text{Type II census} \times 1.0)$$
$$+ (\text{Type III census} \times 2.3) + (\text{Type IV census} \times 3.8)$$
$$+ (\text{Type V census} \times 5.5) \qquad (4)$$

The use of relative acuity values allows the WI to be viewed as the equivalent number of Type II patients on the unit (47). If one chooses this interpretation, it follows that a hospital could estimate total nursing care requirements for the unit if it could estimate the average number of care hours given to a Type II patient. Such an estimate is in fact required by MEDICUS, and is called the "target hours per workload index" (THPWI) factor. Assignment of a value to THPWI is left to the discretion of each hospital, and represents a care-hours standard from which required staffing can be deduced. The THPWI value for St. Elizabeth's is 3.9, implying a staffing target that each Type II patient receive an average of 3.9 hours of nursing care every 24 hours (47).

With a computed WI and a constant THPWI, MEDICUS can derive a 24-hour total staffing recommendation for the pediatrics unit by multiplying the two numbers together. It also has the ability to break the 24-hour total down by shift and by skill-mix per shift (47). In the pediatrics unit example, the unit nurse manager may decide as a matter of policy that he or she wants 43% of the recommended staff on day shift, 34% on evenings and 23% on nights if the average patient acuity falls in the Type I category. If, however, the average patient is a Type V, he or she may want a breakdown of 35%, 33% and 32%. Twenty-three percent may be sufficient to staff the night shift, when Type I patients are less likely to require nursing care. For intensive

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care Type V patients, who need more care around the clock, the distinction between shifts may be blurred, necessitating a more even distribution of staff. Along similar lines, the nurse manager may want 85% R.N. staff per shift for Type I patients, but 100% R.N. staff for Type V patients. Whatever the case, MEDICUS gives the St. Elizabeth's nursing director daily staffing recommendations by unit, shift and skill-mix. These recommendations can be affected to a large extent by the values he and his staff program into the system.

St. Elizabeth's determines its annual medical/surgical and psychiatric nurse baseline staffing requirements by averaging the daily recommendations provided by MEDICUS over the previous 12 months, and adjusting to account for vacation, holiday and sick time (47). The nursing director may make other adjustments if there is reason to believe the patient census and/or acuity may differ significantly on a unit from one year to the next, but such would be an exception (47). MEDICUS also provides daily and year-to-date variance reports which compare the baseline staff (i.e., the scheduled staff) with the recommended staff generated by the previous day's classifications. A trend in variance (either positive or negative) may be used to support baseline staffing adjustments at any point in the year.

As noted above, MEDICUS does not provide patient acuity measures and staffing recommendations for labor and delivery. Because of the unpredictable nature of baby birthing, a patient classification system and related staffing determinant is of very limited usefulness. As a result, St. Elizabeth's uses birthing statistics simply averaged over the past 12 months, and staffs the labor and delivery unit at a constant level, unless additional staff is needed in the short term (47).

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St. Elizabeth's maintains nominal minimum staffing standards separately from the MEDICUS system. Each unit will always have at least one nurse on duty on all shifts. This means that at least one nurse will always be scheduled, even in the case where the daily recommendation from MEDICUS would show an R.N. requirement of zero (which could happen if there were no patients to classify) (47). It also means that even if there are no patients, and nurses scheduled for that unit are pulled to work on other units, at least one nurse will remain at the unit with no patients.

Good Samaritan Hospital and Health Center. Good Samaritan has chosen MDAX as its acuity-based patient classification system. MDAX, a commercial product, is similar to MEDICUS in both concept and application (7). There is, however, sufficient difference between the systems that one may achieve different staffing results using either of them to classify the same patients (7).

One similarity between MDAX and MEDICUS (and other nationally used commercial patient classification systems) is the existence of a national data base available for use by "members" of the particular system. Good Samaritan, for example, submits its census and acuity data annually to the MDAX data base. Another MDAX hospital, say in California, has the ability to retrieve the information for its own use. The California hospital may be opening up a new unit soon, and wants to estimate the unit's staffing requirements. If Good Samaritan currently operates a similar unit, the California hospital can gauge its needs from Good Samaritan's average daily census (ADC), average acuity and recommended staffing data (7). Meanwhile, other hospitals' information is available for comparison. Users of a particular commercial system

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typically must agree not to modify it without the assistance of the system's developer, thus maintaining the integrity of the data by insuring it is generated from the same "groundrules" nationwide (7).

The MDAX system includes two different classification sheets, one for medical/surgical units and one for the psychiatric units. As with many (if not most, or indeed, all) other patient classification systems, MDAX does not address labor and delivery units (7). Patients are classified once a day at Good Samaritan, between the hours of 7:00 a.m. and 10:00 a.m., by the permanent or relief charge nurse of each unit. Care indicators that will apply to each patient during the next 24 hours are marked on the classification sheet. Each indicator is weighted with a certain number of points, but in some cases that number varies from unit to unit. Such variation is an attempt to quantify the fact that the same circumstance or task on two different units may require different amounts of nurse intervention. The "admission/transfer in" indicator may be valued at two points on an orthopedic unit, reflecting a certain level of required nursing care. On the other hand, "transfer in" to a SICU may be valued at 4 or 6 points, since a patient just out of surgery is likely to require considerably more nursing attention (7). The implication of a system with variable indicator weights is that two patients, each with the same indicators marked, may yield different point totals if they are on different units.

The number of points a patient "earns" determines the type category in which he or she is placed. MDAX uses four types to distinguish patients. The point range for a type I patient is 0 - 24, equating to 0 - 2 hours of required nursing care per 24 hours. The range for a type IV is 121 or more points, equating to 10 or more required nursing care

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hours per 24 hours. Once all the patients on the unit have been classified, a relative index of workload (RIW) can be computed. The RIW is analagous to MEDICUS' WI, and like the WI yields the equivalent number of type II patients on a unit (7). Using acuity values provided by MDAX for each type, RIW is computed according to the following formula:

$$RIW = (\text{Type I census} \times .5) + (\text{Type II census} \times 1) \\ + (\text{Type III census} \times 2.5) + (\text{Type IV census} \times 5) \quad (5)$$

To determine total hours of nursing care required for the next 24 hours, the RIW value is multiplied by the predicted number of hours to be spent per RIW. At Good Samaritan, the hours per RIW factor varies from unit to unit, from 2.9 on a medical/surgical unit to 4.35 on the ICU (7).

A patient classification system's primary purpose is to develop near-term staffing requirements, regardless of the particular characteristics of the system (37:105). When patients are classified during the day shift, the staffing projection affects the upcoming evening and night shifts, as well as the next day shift. Some hospitals, such as St. Elizabeth's described in the previous section, classify once a day and make no adjustments until the next day, even if patient census changes. Other hospitals classify patients every shift and adjust staffing if necessary. Good Samaritan attempts to strike a happy medium, actually classifying patients only during day shift but adjusting for changes in census during the evening and night shifts. This requires estimating RIW for these two shifts, done by multiplying actual census by the average acuity per patient for that day (computed during the day shift classification) (7). Though this method is not as accurate as classifying each shift, it provides some warning that the

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next shift may need to be adjusted if census has changed since the day shift.

Once the total number of care hours required for the next 24 hours has been provided by MDAX, the system breaks down the total by shift and skill-mix per shift. This feature is, as with MEDICUS, a function of inputs made by decison makers, external to the system itself. The percentages of staff per shift and R.N.s per shift can be modified at any time. However, Good Samaritan usually considers changing them either when preparing the annual budget, or when the existing percentages are demonstrated to be clearly inadequate (7).

Long term nurse requirements at Good Samaritan are based on a total number of budgeted patient days for the next year, provided by the finance department to the nursing administration department. This number reflects historical patient census trends, as well as expectations for significant changes in the upcoming year. Nursing administration breaks down the total by unit, and calculates a predicted ADC for each unit. For labor and delivery, this ADC is translated directly to a constant level of staff required every day, for all three shifts. For all other units, the ADC is multiplied by the unit's average acuity per patient (from the past year) to arrive at an estimated daily RIW for the next year. The estimated RIW is then multiplied by the unit's particular hours per RIW factor, yielding a number which represents the unit's predicted daily requirement for caregiver hours. This requirement is broken down according to the desired R.N. percentage and adjusted for sick, vacation and holiday time. Total nurse requirements for the hospital are the sum of the requirement for each unit (7).

As noted above, labor and delivery budgets staff at a constant level, effectively providing a minimum staff that can be supplemented if necessary, but never reduced. For some units, Good Samaritan maintains minimum staff levels based on patient census: medical/surgical units (except cardiac and surgical) have minimums if patient census is 12 - 18 patients (each unit is an 18-bed area). If census is below 12, however, there is no set minimum and staffing is analyzed on a shift-by-shift basis, using MDAX as the primary input. For the cardiac and surgical units, minimums apply regardless of census (7).

Grandview Hospital and Medical Center. The patient classification instruments used for MEDICUS and MDAX are examples of what Gallagher called "nursing activity" instruments (19:46). Each patient is assessed according to whether the factors listed on the instrument apply to him or her (a yes/no judgement). Each factor carries a point value which translates to some amount of required nursing time. Thus, by totalling a patient's points, one is indirectly totalling the minutes and hours of nursing care the patient will need. It is an "indirect" total in the sense that, at least in the cases of MEDICUS and MDAX, each patient acuity type is defined by a range of points and associated range of required care hours.

Grandview's patient classification instrument is an example of the "patient category" approach (19:46). It is part of the Hospital Association of New York (HANY) patient classification system, used at Grandview since 1985. The classification sheet lists ten criteria, most of which apply to all patients to one degree or another (39). The decision then is not so much whether criteria apply, but to what extent they apply. Examples of HANY criteria include "bathing", "feeding",

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"medications", "mental status" and "teaching" (42). When classifying a
patient, a nurse places him or her in one of several categories for each
individual criterion, depending on the amount of nursing care needed.
Medical/surgical and psychiatric unit classification sheets have six
categories (0 - V), while the critical care units have eight (0 - VII).
Each category reflects an increasing, mutually exclusive degree of
nursing care for a particular criterion; category 0 is used in those
instances when the criterion does not apply. Guidelines for assigning
categories to the various criteria are provided with the system. For
example, a patient would be assigned a "category I" under the bathing
criterion if he could bathe himself; if he needed minimal assistance
with washing his back, he would be a "category II"; and if he required 2
staff to give him a complete bath, he would be a "category V" (42).

Once a patient has been assigned a category for each criterion, the
nurse must determine an overall rating based on a weighted average. The
patient "earns" one point for each "category I", two points for each
"category II", and so on. The total points are divided by the number of
applicable criteria, and the result is rounded to the nearest whole
number (42).

Each unit (except labor and delivery) classifies all its patients
prior to 1:00 p.m. each day shift. Critical care units always
re-classify during the evening and night shifts; the other units do so
only on an individual patient basis, either for a new patient who was
not classified earlier or for a patient whose condition has changed
dramatically since 1:00 p.m. (39).

To determine unit staffing requirements for the next 24 hours, each
patient's overall category is first multiplied by the appropriate

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hours-per-category weight. These weights were determined empirically at Grandview in 1985, and vary from unit to unit. They are intended to represent the average amount of nursing time required by a patient in a particular category during a 24-hour period. A patient with an overall rating of "category I" on a medical/surgical unit may require 1.9 hours of care, whereas a "category I" on a telemetry unit may require 3.2 hours. A unit totals the amount of nursing care required by all its patients, thus computing its requirement in terms of "nursing hours per patient day" (NHPPD) (42). Since some, if not all, of the units will re-classify during the upcoming evening and night shifts, the NHPPD figure is subject to change before the next 1:00 p.m. classification. The revised NHPPD is used to determine if staff adjustments are necessary for the upcoming shift. In some cases, the revised NHPPD may even be used to affect staffing for the current shift (42). Like MEDICUS and MDAX, HANY provides the capability to break down the 24-hour total requirement by shift and skill-mix, based on user-defined needs.

Grandview did not use the patient acuity data generated by the HANY patient classification system in formulating its 1989 staffing budget. Instead, the 1989 budget was based on the number of positions funded in the previous budget. This approach in effect reinforced the staffing status quo, implying that "if 'x' positions were sufficient to do the job last year, they will be sufficient this year". The Grandview Director of Nursing Services believes that the situation stemmed from basic mistrust of the acuity data provided by the HANY system. The system is currently being updated, and the Nursing Services department hopes to return to acuity-based staffing budgets in future years (39).

At least 2 nurses staff every Grandview unit each shift. Labor and delivery, which the HANY system does not address, is staffed with a minimum of 3 nurses per shift, and can be supplemented if necessary. The nursery is also staffed with a minimum of 3 nurses. Minimum staffing for the pediatrics and maternity units varies by shift: for both cases, the minimum staffing pattern is 3 (day), 2 (evening) and 2 (night) (42).

Comparison of Staffing Methods

Patient Classification Systems. In trying to understand a particular hospital's way of determining nurse staff requirements, the first question one should ask appears to be, "Does the hospital use a patient classification system?". If the answer is "yes", the acuity data generated by the system probably (but not definitely) forms the cornerstone of the hospital's staffing process. If the answer is "no", the process is likely to be based on less sophisticated data, such as ADC statistics. Though it is obviously possible to achieve adequate staffing without patient classification systems, the clear majority of literature on the subject supports their use as a logical and necessary step forward in battling the nurse staffing problem.

Because of circumstances beyond its control, the U of I hospital abandoned plans to implement a patient classification system, choosing instead to determine nurse requirements with projected ADC numbers and desired nurse-to-patient staffing ratios. The Air Force does use a patient classification system in some of its hospitals, but bases its core staffing requirements on bed occupancy data averaged over the most recent 12 months. St. Elizabeth's, Good Samaritan and Grandview use patient classification systems as the primary input to their staffing

processes. All of the systems were described earlier in this chapter; however, the differences and similarities among them merit further discussion.

The distinction between Gallagher's "nursing activity" patient classification instrument, exemplified by MEDICUS and MDAX, and the "patient category" instrument, exemplified by HANY, has already been explained (19:46). The nursing activity approach essentially requires that the classifying nurse make a series of yes/no decisions: either the factor applies, or it does not. The patient category approach, on the other hand, requires that the nurse recognize various levels of needed care for several criteria. Neither of these approaches is innerently better than the other. The success of the "nursing activity" instrument depends mainly on how narrowly each factor can be defined: more narrowly defined factors leave less room for subjective interpretation by the nurse (19:46). A tradeoff must be made, however, becasue the price for narrowness is an increased number of factors. This results in longer classifying times and a higher potential for error due to carelessness or lack of concentration. Successful use of the patient category instrument depends on how clearly each category is described for each criterion. A nurse has to be able to consistently place patients in the appropriate category; to do so, the guidelines for inclusion in each category must be explicit, but not so extensive that they become unwieldy.

The WMSN is a modified version of the nursing activity approach. It requires the nurse to determine which care indicators apply to the patient, but provides the flexibility to assign more points when circumstances allow. This flexibility helps to capture workload that

MEDICUS and MDAX may miss, i.e., those tasks performed with greater
frequency than the indicator specifies and those tasks that require
substantial nursing care from more than just the classifying nurse.

All three of the patient classification systems used by the
civilian hospitals in this study are commercial products. Though
commercial systems can be tailored to some extent on an individual
hospital basis, a requirement to maintain commonality with other users
of the system (for data base purposes) greatly restricts such tailoring.
As a result, nurses who use commercial systems generally are made to
classify patients according to factors or criteria which were developed
and implemented without their input. This may impact their acceptance
of the system. If they do not believe the factors accurately reflect
their workload, or that the system somehow does not "fit" their
hospital, they may put less than the desired amount of care into
classifying patients. An internal classification system, developed with
the input of the nurses who will actually use it, may generate more
enthusiastic acceptance by the staff. On the negative side, using an
internally developed system means foregoing the benefits of a commercial
system, which may include extensive testing for reliability and
validity, system updates and access to a common data base. Even though
the WMNS was developed by the Department of Defense, it is essentially
a commercial system to individual Air Force hospitals, since the ones
that use it had no say in its creation. As a result, its acceptance may
be affected as though it actually were a commercial product.

All of the systems discussed have separate classification
instruments for the psychiatric units, though some of the indicators are
common with the medical/surgical instruments. This is a response to the

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unique tasks associated with psycniatric nursing. None of the four, however, has an instrument to deal with tne area of labor and delivery, because of its unpredictable nature.

The three activity-based systems - MEDICUS, MDAX and WMSN - assign points to each care indicator; total points determine a patient's type. MEDICUS uses five types, whereas MDAX uses four and WMSN uses six. Furthermore, the MEDICUS and WMSN indicators carry the same point value across all units (except psychiatric units); MDAX indicator points may vary from unit to unit. The significance of these differences is difficult to assess, and in practice may be negligible. Classification of patients is an inexact science to begin with. When one considers the way in wnich these systems translate patient classification to unit staffing - factors to points to type to Wi (MEDICUS) or RIW (MDAX) to total required hours - it seems unlikely that such differences would have much of an impact, especially on units that classify twenty or more patients at a time.

There is room for variance in the application of a patient classification system that has nothing to do with the system itself. For example, hospitals must determine when and how often nurses will classify patients, no matter what systems they use. Grandview. Good Samaritan. and St. Elizabeth's all classify patients during the day snift, because it is during day shift tnat the patients' care needs for the next 24 hours can best be estimated. Both patients and pnysicians are typically more active at this time, so nurses get the most complete picture of what types and amounts of care patients will need. St. Elizabeth's makes no further adjustments to the day shift classification, believing that increases and decreases in census and

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patient acuity tend to balance out over a 24-hour period. Good
Samaritan adjusts for changes in census during evening and night shift,
using a daily average acuity figure as an estimate for each patient.
Grandview reclassifies every shift in the intensive care units, and may
reclassify particular (or new) patients on other units. Air Force
hospitals that use the WMSN classify once a day, during day shift, with
no additional adjustment to the system. The benefit of classifying
every shift is apparent: the most accurate, current assessment of
nursing care needs. Adjusting for census is probably better than doing
nothing at all for getti g current information. However, such
information has a cost: increased workload for the nurses who have to
classify, and increased training requirements to insure all nurses know
how to use the system. At St. Elizabeth's, where classification is done
only on the day shift, only the nurses who are likely to work day shift
need to know how MEDICUS works. Obviously, different hospitals place
different weights on the costs and benefits of frequent classification.

Hospitals must also decide who will do the classification. At
Grandview and St. Elizabeth's, as well as in Air Force hospitals with
the WMSN, the staff nurses classify those patients to whom they directly
provide care. At Good Samaritan, however, classification is done by the
charge nurse (or relief charge nurse) for all patients on his or her
unit. Once again, there are positive and negative aspects of either
choice. A staff nurse is most qualified to determine which care
indicators apply to his or her patient, especially when considering
intangible factors like "emotional support" or "patient teaching".
Also, using staff nurses diffuses the burden of classification so that
it does not fall to one person. This may be especially critical on

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units with thirty or forty patients. On the other hand, classification
by a charge nurse relieves the staff nurses of additional workload.
Having a single individual classify all patients is likely to produce
more consistent results, since differences in subjective interpretation
among nurses are eliminated. Finally, the training requirement is
limited only to the charge nurses; current and future staff nurses do
not need to know how to use the system.

   Determination of Long-term Staffing Requirements. Regardless of
whether or not it uses a patient classification system, every hospital
faces the task of determining long-term nurse staffing requirements. For
civilian hospitals, the need to develop and operate within an overall
staffing budget must be balanced against the need to provide, among
other things, adequate nursing care. If additional nurses are
necessary, the civilian hospital has the power to redistribute and/or
enlarge the staffing budget. Air Force hospitals, by contrast, do not
have specific staffing budgets to spend at their discretion. Air Force
nurses are "bestowed" upon individual hospitals by a central controlling
agency (ultimately, Congress) that has myriad other budget concerns. The
link between a specific nurse requirement (identified at the hospital
unit level) and fulfillment of that requirement is certainly tenuous, if
it can be said to exist at all.

   Despite this distinction, both Air Force and civilian hospitals
have the strongest incentive to predict long-term nurse staffing
requirements accurately. A relatively high level of baseline nursing
staff carries with it a higher confidence that the demand for nursing
care at any given time can be met without further staffing action. If
a high level of staff continually exceeds the demand, however, the cost

may outweigh the benefit of higher "readiness" and result in wasted resources. On the other hand, a relatively low level of staff will reduce the possibility of wasted resources, but may often fall short of the need for nursing care. The hospital must then supplement the baseline staff (if it can) at increased cost, or constantly provide an inadequate amount of care. Unfortunately, the nature of the hospital business makes it impossible to predict nurse staffing requirements accurately enough to avoid some degree of variance between baseline staff and actual nursing care needs. The best a hospital can hope to do is minimize the variance by establishing a "best fit" baseline that does not grossly overstate or understate the need for nurses in the upcoming budget period (assumed in most cases to be a year).

Each of the hospitals examined in this study except Grandview used some sort of averaged historical data to determine its baseline nurse staff for the current year. Grandview ignored the data from its patient classification system and simply staffed to the same nurse levels as were funded last year. There were no desired nurse-patient ratios established, nor were target-hours-per-patient-day factors developed. Having lost confidence in its patient acuity data, Grandview fell back on the most unsophisticated and qualitative of approaches: with no dramatic changes in census expected, what was adequate last year will be adequate this year. Meanwhile, the HANY system is being revised, and may re-emerge soon as the basis for Grandview's long-term nurse staffing process.

The Air Force and U of I staffing methods both require computation of average census data over the most recent 12 months, but the data is expressed in different units: patients per month for the Air Force, and

patients per day for the U of I. This difference is simply the result of the way in which the methods were developed, and certainly has no significant impact on staffing. Air Force data is plugged into a regression equation to determine total number of caregiver hours required. This total is divided by the manhour availability factor (MAF), yielding the number of required staff persons. Manpower tables break down the number into nurse and technician requirements. U of I data (ADC) is divided by the staffing standard, which represents the number of patients for which a nurse should be responsible. This determines the number of nurses needed to staff a shift, forming the base for daily and annual requirements. The major difference between these two methods is that the Air Force equation is constant for all medical/surgical units, whereas the staffing standard used by U of I varies by unit. The variable standard recognizes a difference between nursing tasks on certain medical/surgical units and attempts to compensate for it.

The calculation of average census data is useful and important but, as Nauert suggests, it is not sufficient to adequately identify required staff (36:25). The purpose of acuity-based staffing methods, such as those used by Good Samaritan and St. Elizabeth's, is to measure nurse requirements by accounting for differences among individual patients' care needs. Good Samaritan makes its long-term staffing projections by multiplying a unit's predicted ADC by the average acuity (as measured by MDAX) of patients on that unit during the last year. The result is a predicted daily relative index of workload (RIW), which is multiplied by the unit's hours-per-RIW factor to produce total required caregiver hours. St. Elizabeth's determines long-term requirements at more of a

"summary" level, simply averaging the daily acuity-based nurse requirements provided by MEDICUS over the previous year. As mentioned above, MEDICUS and MDAX do not address labor and delivery units. Good Samaritan and St. Elizabeth's, like the other hospitals, must use average births as the measure for staffing these units.

It is important to note that there is no "right" or "wrong" in the attempt to determine long-term nurse staffing requirements. The "short-cut" approach taken by Grandview for this year's budget is not doomed to failure any more than the census- or acuity-based approaches taken by other hospitals are guaranteed to be effective. Even the acuity-based staffing methods are based on <u>averaged</u> data of one form or another. The problem with averaged data, of course, is that there may be relatively few average days, either in terms of census or acuity. For example, one may be able to exactly predict the ADC for the next year at a given hospital. On any given day where the actual census differs from the average, however, the hospital could be over- or understaffed. This imprecision is the primary reason that nurse requirements must constantly be examined in the short term.

<u>Determination of Short-term Staffing Requirements</u>. If the goal of long-term staffing is to establish a baseline that minimizes total variance between predicted and actual nursing care needs, the goal of short-term staffing requirement definition is to determine what those actual needs are. This is a goal not easily met, though, since even short-term staffing must be based on prospective patient needs; otherwise, it may always run a step behind. Still, a short-term projection can be expected to be considerably more accurate than a long-term projection, especially when the difference between their

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frames of reference is large. Given that one accepts "the next 24 hours" as the standard for short-term staffing assessments and "annual" for long-term assessments, as the literature suggests, this point can hardly be disputed. The valuable information available to nurse administrators in the short-term, on actual patient census and/or acuity, serves as a foundation for daily nursing care need projections that will be consistently more accurate (and defensible), since the long-term projections are made without the benefit of such information.

Even though Grandview did not use its patient classification system to support long-term nurse requirement determination this past year, it does use the system to project short-term needs. Thus, all three of the civilian hospitals in this study that have patient classification systems - Grandview, Good Samaritan and St. Elizabeth's - use them to support short-term staffing need assessment. The WMSN is used for the same purpose in those Air Force hospitals where it has been implemented. The details of the systems and their applications in the short-term have already been discussed in other sections, but one particular aspect bears repeating here: the frequency of classification. Both Grandview and Good Samaritan make updates to their day shift patient classifications on evening and night shifts, while St. Elizabeth's and Air Force hospitals do not. If daily classification is "short-term", Grandview's and Good Samaritan's updates are "immediate-term" staffing projections. They use census and acuity data that have been revised since the day shift classification; hence, they are more current and, presumably, more accurate. Whether this additional accuracy is worth the cost of obtaining it can only be decided by the individual hospital involved.

The lack of patient classification systems in the U of I Hospital and most Air Force hospitals does not relieve these facilities of the need to make short-term nurse staff requirement determinations. It simply means that the determinations must be made subjectively. During every shift, the head nurses at the U of I Hospital decide whether the baseline staff for their units is adequate, and whether a staff adjustment is necessary. They also assess whether the next shift will require an adjustment. As a guide, U of I Hospital head nurses can use the standard nurse-patient ratios that support the long-term staffing process, but the assessment is still primarily subjective. Air Force charge nurses and nursing supervisors make the same judgements, but without the target ratios. Obviously, these projections are based on the considerable experience and intuition of the persons involved. What is not so obvious, however, is that experience and intuition can be very effective in such circumstances.

When head nurses and charge nurses make subjective assessments of the nursing care needs of their units, they function much as a patient classification system does. They consider how much care each patient is expected to need; the capabilities of their staff; and whether the capabilitites are sufficient to meet the expected need. The major advantage that an actual classification system has over such evaluations is, of course, the classification system's ability to quantify nurse requirements in a consistent manner. The experienced nurse's subjective assessment, though valuable, will likely be secondary to the system in hospitals that use classification systems. In the U of I hospital and the majority of Air Force hospitals, however, the

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subjective assessment is essentially the only way to determine short-term nurse staffing requirements.

Short-term Staffing Adjustment. Once a hospital has determined its short-term needs, it can calculate the variance between them and the baseline staff positions. The variance may be positive (more baseline staff than is needed) or negative (baseline staff is insufficient). If the variance is slight, hospital management may ignore it and take no action. If, however, it is significant in either the positive or negative direction, a staffing adjustment may be necessary Though only temporary adjustments will be considered here, it is important to note that a persistent trend in positive or negative variance (baseline is .lmost always too high or low) may lead the hospital to permanently adjust the baseline staff in response to the trend.

At the hospital level, there are three common ways of generating additional nursing care hours: overtime, "float" pools and external nursing agencies. Overtime may seem like an obvious choice, but it requires squeezing more effort out of resources that are already overburdened. "Time off" is a precious commodity to nurses, who need it to recover from the stress they encounter during their regular hours. While the premium overtime pay is certainly attractive, it is often inadequate to entice a nurse to come to work on an off-day, or to remain after completing a normal shift. An internal "float" pool. if a hospital has one, consists of nurses employed by the hospital on either a full- or part-time basis. These nurses do not have regular staff positions, but rather are intended to go where they are needed throughout the hospital. If they are not needed, they do not work.

They are limited to areas which do not require special skills they either do not have, or are not current in. An additional drawback is that while these nurses are employed by the hospital, and are familiar with general hospital policies and operations, they may be forced to work on units which have ways of doing things that differ from the unit they worked on the previous day. This lack of continuity is a potential source of concern not only to the nurse, but also to the patient, who may have to "re-educate" an unfamiliar nurse on his or her condition, fears, level of understanding about his or her illness, etc. (29). These problems are compounded with the use of the agency nurse, who is an employee of the agency and may literally be at a different hospital each day for several days. Use of agency nurses can also be quite costly, since a hospital must pay a premium to the agency in addition to the cost of the nurse (48:35).

The nursing care hours generated by overtime, float pools and external agencies are truly additional, in that they increase the total number of hours provided by the hospital. Another type of short-term staff adjustment involves the reallocation of baseline staff nurses from one unit to another. This action, also called "floating", is different from a float pool because it only changes the unit where the hours are worked, not the total number of hours. (To avoid confusion, float pool nurses will be referred to simply as pool nurses from this point on). Floating baseline nurses is a way for hospitals to balance positive and negative staff variances, optimizing the care need - care provider mix without having to employ additional resources. As is the case with pool nurses, the ability of baseline nurses to float depends on the extent to which their particular nursing skills can be applied to other units.

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The option of floating baseline staff is particularly attractive to Air Force hospitals, which are not authorized enough personnel annually to maintain formal float pools of military nurses. The problem is, of course, that effective floating requires an overage of nursing hours somewhere in the hospital. While this may occasionally be the case in an Air Force hospital, it is certainly not a situation to be counted on when attempting to fulfill a unit's need for more nursing care hours.

An alternative to float pools staffed with Air Force nurses involves the use of civil service personnel. If a hospital has sufficient money to do so, it can create a pool of civil service nurses that provides service like a civilian hospital's float pool, including on-call response. An Air Force hospital can also hire civil service personnel as "overhires" for periods ranging from days to just short of a year at a time. Overhires are typically not available for immediate duty, however, because of the time the recruiting process takes (26). In any case, the use of civil service nurses to supplement Air Force hospital baseline staff usually comes down a matter of money. Since the civilian pay budget of a hospital is based essentially on annual staff positions, funding for temporary positions must come at the expense of some other budget element (26).

Air Force hospitals frequently require nurses to work overtime, as a means of meeting patient care needs. Since Air Force nurses are not paid an hourly wage, the appeal of overtime as a money maker is foregone. Instead, overtime simply translates to working longer hours. Although this is true for every military officer, there is a point beyond which people should not be made to work (2:3). For the nurse,

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this point is whenever his or her ability to safely provide adequate patient care becomes compromised (2:3; 45:208; 48:35). Thus, the decision to use overtime as a temporary staffing adjustment must be made judiciously.

As is the case with temporary civil service employees, the use of external agencies to support short-term Air Force staffing needs is limited by the individual hospital's ability to find money for the purpose. Again, the hospital is not provided with a budget specifically for establishing contracts with nursing agencies. A hospital that wants such a contract must pay for it with money originally earmarked for some other use (5).

The use of overtime, float pools and agencies represent Air Force (and civilian, for that matter) hospitals' attempts to modify the short-term supply of nursing care. To a certain extent, the Air Force has flexibility to modify the demand for nursing care as well. By establishing priorities in the event of sudden surges in critical patient needs, Air Force hospitals can postpone and reschedule non-critical patient services and concentrate the available nursing care on those who need it most. This consideration notwithstanding, the limitations on Air Force hospitals' ability to make short term staffing adjustments often force units to provide patient care with less nursing staff than they actually need. The problem is compounded by the long time it takes to fill baseline positions when nurses separate from the military or are reassigned. The remaining nurses must then be called upon even more to absorb the burden, but their ability to do so is not infinite.

Civilian hospitals are by no means exempt from such concerns. Scarce financial resources and overworked staff are not circumstances unique to the military. However, a civilian hospital generally has more flexibility in exercising the short-term options discussed above, especially float pools and supplemental staffing agencies. If the perceived benefits are expected to exceed the costs, a civilian hospital will do everything possible to make resources available to use these staffing methods. It may choose to pass some of the cost on to the consumers of the nursing care in the form of "price increases". Air Force hospitals, by contrast, must make the best of what they are given, and even face restrictions on the purposes for which certain catergories of money may be spent.

Of all the civilian hospitals included in this study, St. Elizabeth's is the only one that does not currently have a float pool (47). In addition, St. Elizabeth's has a policy of not using supplemental agencies. When faced with the need for additional nurse resources for an upcoming shift, the unit nurse manager first attempts to fill the need from within the unit. He or she offers overtime to the nurses working the current shift, and, if necessary, calls nurses assigned to that unit at home to offer them additional work. If he or she still projects a shortfall for the next shift, or if a shortfall develops during the current shift, the nurse manager then calls the nursing director or his delegate. The nursing director has the authority to float baseline nurses to alleviate the situation, and will do so if some other unit can spare the nurse(s). Since this process occasionally fails to generate the required nursing care hours,

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St. Elizabeth's plans to develop and begin using an internal float pool sometime within the next year (47).

The U of I Hospital also has a policy of not using supplemental agencies, although the policy has been violated a few times in recent months because of an inability to fill some ICU nurse baseline positions (21). When a need for additional short-term nursing staff is identified on a unit, the head nurse informs the nursing administrator. The nursing administrator will float baseline staff if possible; otherwise, she will call on pool nurses. Baseline staff are considered first, since they are being paid by the hospital anyway. This approach insures that negative short-term staff variances are eliminated at minimum cost to the hospital. In the relatively uncommon case that a unit has a positive variance but the nurses are not needed elsewhere, the U of I Hospital reserves the right to send baseline staff home or cancel their upcoming shift without compensating them (21).

Grandview and Good Samaritan use both float pools and supplemental agencies on a regular basis. As with the other hospitals, however, floating baseline staff is the first option they consider when a need for additional nursing resources is identified (7; 39). If floating is not feasible, the nursing director can use overtime, pool nurses or agency nurses, usually in that order of preference. A problem with pool and agency nurses is that they are generally scheduled more than 24 hours in advance, before it is determined whether they are actually needed. Some agencies and nurses do have the flexibility to respond immediately (within 24 hours) if they are called on, but most hospitals do not want to take the chance of waiting that long. As a result, many make staffing projections two weeks to four weeks ahead of time to

estimate pool and agency nurse requirements. If they are not needed, these nurses can be cancelled, though some agencies require partial payment by the hospital in the event of cancellation (7). In cases where there are positive variances that cannot be floated elsewhere, and all pool and agency nurses have already been cancelled, Grandview and Good Samaritan will also send home/cancel baseline staff.

Minimum Staffing Standards. Every hospital included in this study maintains some form of minimum nurse staffing standards. These standards may vary by unit, shift and/or census level, but in all cases their purpose is to minimize the risk of being grossly understaffed in the e ent of some unforeseeable circumstance that dramatically increases a unit's need for nursing care.

Minimum nurse requirements for Air Force hospitals are established in AFMS 5206 (medical/surgical units) and 5207 (obstetrical units). The medical/surgical minimums vary depending on whether the facility has one or two wards, a close observation room (COR), and/or a SCU. For example, a hospital with one ward and a SCU has minimum nurse requirements of 2 (day shift), 1 (evening) and 1 (night) for the ward, and 1, 1 and 1 for the SCU. Many Air Force facilities have more than two medical/surgical wards, however, and are not addressed by the standard. AFMS 5206 advises that "these larger facilities should only operate additional wards when the workload is sufficient to earn or exceed minimum manpower through the application of the basic standard" (12:3). Minimums for obstetrical units depend on whether the labor and delivery rooms are located on the same floor as the post-partum ward and nursery. If so, the minimum nurse requirement is 3 (day), 2 (evening) and 2 (night). If not, the minimum is raised to 3, 3 and 3. Though

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these sorts of distinctions can be somewhat confusing at first look, they are necessary because of the wide variety of facilities to which the manpower standards must provide guidance.

All of the civilian hospitals staff labor and delivery units with a constant number of nurses, thereby creating a minimum which can be exceeded (usually with "on call" pool or agency nurses) if necessary. The level of staff in all cases is determined in the long-term, based on average birth statistics for the particular hospital. Good Samaritan's medical/surgical units have minimum staffing standards based on census and shift. If the census is 12 -18 patients, the minimum staffing pattern is 4 caregivers (day), 3 (evening) and 2 (night). The word 'caregiver" is used instead of "nurse", since in some cases licensed practical nurses (L.P.N.s) and nurses' aides (N.A.s) are used to staff to the minimum. If the census is less than 12, the minimum staffing requirement is analyzed each shift. In all cases, regardless of census, a charge nurse is on duty. The other three hospitals maintain nominal medical/surgical nurse minimums that do not vary by shift or census: 2 (Grandview); 1 (U of I Hospital); and 1 (St. Elizabeth's).

As mentioned above, the minimum levels to which a hospital chooses to staff reflect that hospital's willingness to take (or avoid) the risk of being caught with inadequate manpower should an unusual need arise. The tradeoff involved with establishing minimum staffing is very similar to the tradeoff of higher vs. lower baseline staff. A higher minimum provides protection against the consequences of a sudden increase in nursing care needs, but it also costs more to keep nurses on duty who are not truly needed. On the other hand, a lower minimum

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costs less, but increases the potential of a staffing crisis if census

rises sharply in a short period of time. To arrive at a satisfactory

staffing minimum, each hospital must take into account the chances of

being affected by such a situation, as well as the consequences of

being caught short. In this regard, both the civilian and Air Force

hospitals seem to be essentially in agreement, maintaining minimums

that are relatively low.

Response to Guiding Questions

The first section of this chapter, "Description of Staffing

Methods", answered the first two guiding questions posed in Chapter I.

Both the Air Force method of determining nurse manpower requirements and

the methods used by the sample civilian hospitals were described in

detail. The other two guiding questions were answered in the second

section, "Comparison of Staffing Methods". Differences among Air Force

and civilian hospitals, and among civilian hospitals themselves, were

identified within the framework of five significant elements of the

staffing process: patient classification system, long-term staffing

requirements, short-term staffing requirements, short-term staffing

adjustment, and minimum staffing standards. This format, an integrated

comparison of all hospitals within each of the staffing elements, was

judged by the researcher to facilitate the most concise description of

differences in the staffing methods.

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study was prompted by a concern that the current Air Force method for determining nurse manpower requirements may understate the actual need because it fails to accurately reflect the amounts and types of work Air Force nurses perform every day. By examining the Air Force method and comparing it to methods used in civilian hospitals, the researcher hoped to identify ideas from the civilian staffing process that the Air Force could adopt and thereby improve its ability to accurately assess and meet its nurse staffing needs. As a result of this study, the researcher has identified two general areas where the Air Force should be following the lead of civilian hospitals: patient classification systems and short-term supplementing of baseline staff.

Patient Classification Systems. The major difference between Air Force and civilian hospital nurse staffing methods involves the use of patient classification systems. All but one of the civilian hospitals examined here use an acuity-based patient classification system to determine nurse requirements. The exception is the U of I Hospital, which had actually been in the process of developing a system when extraordinary circumstances intervened. The Air Force continues to use averaged census data to determine its annual staffing requirements, while it very gradually implements the Workload Management System for Nursing (WMSN) patient classification system to comply with DOD direction. Those Air Force hospitals that already have the WMSN are

using it to support short-term need assessment, but they are currently the minority.

The DOD requirement to implement the WMSN makes the future of Air Force nurse staffing a moot point, though exactly when that future will come to pass is uncertain. Lacking an overall plan and timetable, Air Force hospitals are left to their own devices to implement the system whenever they can (5). The 1 October 1989 DOD deadline notwithstanding, it will be at least several months before all Air Force hospitals will have implemented the WMSN to support the acuity-based Joint Healthcare Manpower Standards (5).

Even if the DOD requirement had not been generated, however, the Air Force would have been well-advised to implement a patient classification system. Civilian nursing administrators and hospital managers seem to be convinced that patient acuity is a better measure of required nurse workload than simple census, a view shared by many Air Force nurses (32) and confirmed by current literature. The particular system to be implemented, the WMSN, is similar in many respects to other patient classification systems. To fulfill its purpose, each system identifies nursing tasks, establishes patient category parameters and translates the categories into required nursing hours. The differences in definition of workload and the values used to translate categories to hou are difficult to assess. However, the WMSN appears to be superior to the other systems on two counts. The first is the classifying nurse's flexibility to assign additional points for some indicators, based on frequency of occurence of the need for more than one person to complete the task. This flexibility captures some workload that the other systems miss. The second is the fact the WMSN uses more

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specifically defined indicators than any of the other systems reviewed in this study, reflecting a more comprehensive view of the nurse's workload.

An area where use of the WMSN might be enhanced involves the frequency of classification. As discussed in Chapter IV, the WMSN is used to classify patients every 24 hours. Grandview classifies its patients on some units once every shift, and Good Samaritan adjusts for census every shift using average acuity values. In both civilian cases, the hospitals found that the benefits from more frequent classification (i.e., more accurate and more current information) outweighed the costs, and allowed them to make judicious and necessary short-term staffing adjustments they could not otherwise have made (7; 39).

Short-term Supplements to Baseline Staff. The other significant difference between Air Force and civilian nurse staffing methods is the degree to which baseline staff can be supplemented when short-term requirements show such a supplement to be necessary. Civilian hospitals routinely use formal float pools and external nursing agencies to provide additional nursing support to their baseline staffs. They generate higher costs in terms of administration as well as wages, but pools and agencies allow hospitals to operate with generally lower levels of baseline staff. Once again, the civilian hospitals obviously have found that the benefits of pools and agencies outweigh the costs of using them. Air Force hospitals, on the other hand, are not authorized sufficient nurse manpower to maintain military-staffed float pools. Further, their ability to use civil service nurses and agency nurses on a temporary basis is limited by the size of their operating

budget. As a result, they are forced to squeeze more and more out of nurses that are too few in number to begin with. This creates a vicious cycle, wherein nurses quit the Air Force because they are overworked. Their absence simply puts more pressure on the colleagues they leave behind.

The short-term purpose of implementing the WMSN (i.e., to identify projected staffing needs for the next 24 hours) is thus defeated if Air Force hospitals do not have the resources to react to demonstrated variances between their baseline staffs and the actual needs. With a finite amount of work that can be squeezed out of nurses, and only a limited ability to float nurses between units, Air Force hospitals must be given the means to procure help from the outside. Though in other situations it might be construed as a symptom of inefficiency, "throwing money at the problem" of Air Force nurse staffing is necessary to insure patient care needs are adequately addressed without "burning out" the the baseline staff and perhaps driving them out of the military

Recommendations for the Air Force

Accelerate Implementation of the WMSN. The benefits of a patient classification system in determining long- and short-term nurse staffing requirements are confirmed both in literature and in practice. The DOD has recognized this, and has directed that all military hospitals begin providing WMSN-generated acuity data by 1 October 1989. The fact that the Air Force still does not have a service-wide program to implement the WMSN, however, is cause for concern. Given the benefits of the system, one would expect that hospitals would be trying to implement it

as soon as possible. Without Air Force-level support, though, hospitals
are forced to make tradeoffs between the system and some other aspect of
their mission, since they must "pay out of their own pocket" for the
WMSN. It is not hard to imagine that some Air Force hospitals may
postpone implementation until the latest possible date, to postpone the
potential disruption and inconvenience associated with it.

To insure prompt compliance with the DOD direction and more quickly
reap the benefits of acuity-based patient classification, the Air Force
should develop and fund a program, including a timetable, at the
headquarters level to implement the WMSN in all its hospitals.
Resources should be provided to the hospitals, not by them, including
training materials, computers and anything else needed for the system.
Instructors should also be identified for the program, perhaps in the
form of traveling teams which can visit each facility. An alternative
to traveling teams is to bring instructor-trainees from each facility to
a central location for training in the philosophy and application of the
WMSN. These individuals could then return to their own hospitals to
pass on the training to their colleagues. Instruction in the use of the
WMSN could also be given to new Air Force nurses as they attend the
Military Indoctrination for Medical Service Officers (MIMSO) program at
Sheppard AFB. Regardless of the method of training, it should be paid
for by the proposed program, not by the hospitals themselves. Funding
for such a program would of course be hard to come by, but without it
compliance with the DOD requirement will be delayed considerably. More
importantly, Air Force hospitals will continue to operate without the
more accurate, acuity-based method of determining nurse staffing needs
that the WMSN facilitates.

Modify Application of the WMSN.   The positive experience that
Grandview and Good Samaritan have had with addressing patient acuity
every shift suggests that Air Force hospitals could benefit from a
similar approach.   To insure that the most current and accurate acuity
data is available for short-term staffing decisions, the WMSN should be
used to classify patients every shift instead of every 24 hours.   The
marginal cost of training would not be an issue; since most Air Force
nurses rotate between shifts, they will need to how to use the system
anyway. If the workload associated with using the system is judged to be
somewhat burdensome, the staffing requirements should at least be
adjusted for current census on each shift as Good Samaritan does.   This
will provide some quantitative support for staffing assessments that
must be made when dramatic changes occur between day shift
classifications.

Provide Separate Funding for Supplementing Staff. Air Force
hospitals rely primarily on overtime and floating nurses when a
temporary need for additional staff over the baseline is identified on
a particular unit.   Demanding overtime and floating cannot work all the
time, especially when staffing may be too thin to begin with.   Given the
unlikelihood of sufficiently large military baseline staffs, the Air
Force must provide its hospitals the means to supplement their
short-term staff without sacrificing other capabilities.   Separate,
additional funding should be identified for the purpose of hiring civil
service and agency nurses when the situation calls for it.   In the
current Air Force nurse staffing environment, the ability to form a
civil service nurse float pool or use a nursing agency is not a luxury.
It is an occasional necessity which enables hospitals to give adequate

nursing care without "burning out" the baseline staff. Though the hospital budget may be have to be larger as a result, it is a price worth paying to keep Air Force nurses from seeking employment elsewhere.

Recommendations for Further Research

The sample of hospitals used in this study was drawn from a particular region of the country, and included three hospitals that used commercially developed patient classification systems as the primary input to their nurse staffing process. Research should be conducted along the same lines as this study, using an expanded sample that draws on hospitals from other parts of the country. Hospitals that use internally developed systems and other hospitals that do not use patient classification systems at all should also be sought for inclusion in the sample. Additionally, the sample may include other federally operated (but non-DOD) hospitals, such as the National Institutes of Health (NIH), Bureau of Indian Affairs (BIA), Veterans Administration (VA), etc. The purpose of varying the sample in this way is to increase the chances of finding different approaches to the problem of nurse staffing which may be of benefit to the Air Force.

Another recommended research effort involves a quantitative comparison of patient classification systems. A researcher could develop and validate a set of mock "patients" with specifically defined and documented nursing care needs. Users of various patient classification systems, including the WMSN, could then classify the "patients" and compute the corresponding amount of nursing care hours generated by their systems. Analysis could include not only a

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comparison of the required hours, but also a comparison of how two users of the same system categorized the same "patients".

On the topic of supplementing nursing staff, in-depth research could be conducted on the civil service system to identify the full range of ways in which civil service nurses can be employed in Air Force hospitals. Another area of interest might be the options that Air Force hospitals outside the continental United States (CONUS) have in terms of hiring temporary nursing help. The relative scarcity of prospective civil service nurses outside the CONUS seems to indicate that if additional help is needed, it would have to come from nurses who are citizens of the country where the Air Force facility is located. If this is true, a researcher could examine the means by which these nurses are (or can be) employed, as well as potential problems in equating the competency of an American nurse (who must pass a state nursing board examination) to that of a foreign nurse (who presumably must pass some other nursing examination).

A final recommendation for further research is an attitudinal survey which would attempt to correlate staffing methods with nurses' perception of adequate staffing. The survey sample would include nurses from hospitals that use commercial patient classification systems, hospitals that use internally developed systems, and hospitals that do not use patient classification systems in determining baseline and short-term nurse requirements. The survey could test the hypotheses that nurses who use internally developed systems perceive staffing as adequate more than those who use commercial systems, and that nurses whose hospitals do not use patient classification systems have a lower perception of adequate staffing than the other two groups.

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The purpose of this study was to compare the ways in which nurse staffing requirements are determined in Air Force and civilian hospitals. Differences in staffing methods might point to ways in which the Air Force could improve its nurse staffing process.

Data on Air Force hospitals' method of determining nurse requirements was extracted from Air Force Manpower Standards 5206 and 5207. Four civilian hospitals, whose staffing methods varied significantly, were used to represent the civilian sector. Methods were compared across five elements of the staffing process: patient classification systems, long-term requirements, short-term requirements, short-term staff adjustment, and minimum staffing standards.

The most significant difference in staffing methods lies in the area of patient classification systems. The literature and the civilian hospitals examined confirm a movement to acuity-based measurement of nurse workload using patient classification systems, though the Air Force still determines nurse requirements based on average occupied bed days. The Air Force is gradually implementing a classification system, the Workload Management System for Nursing (WMSN), but there is currently no headquarters-level program to oversee the implementation. The study recommends creation of a program funded at the Air Force level to accelerate the implementation of the WMSN in Air Force hospitals.

The other significant difference involves the hospitals' ability to supplement their baseline staff when necessary. Civilian hospitals routinely use internal "float" pools and external agencies to temporarily increase their nursing staff. Air Force hospitals' ability to use such measures is limited, since funding must be provided by the individual hospital at the expense of some other budget item. The study recommends that the Air Force provide separate, additional funding to hospitals for use in hiring civil service or agency nurses when a temporary need is identified.